IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 4.] **February, 1934.** [No. 2.

DISEASES CAUSED BY BACTERIA AND FUNGI.

JONES, F. S., & LITTLE, R. B. (1933). **Acid Milk in Bovine Mastitis.**—*J. Dairy Sci.* **16.** 111-119. 4 tables. [8 refs.]

In a series of 440 cases of mastitis the authors have encountered 9 which were associated with distinctly acid milk. Seven were examined in detail. In addition to their acidity, other characteristics in common were large numbers of clumped leucocytes, the majority of which were distorted and stained badly, enormous numbers of viable streptococci of the usual non-haemolytic bovine variety, relatively little carbohydrate and much lactic acid. In addition all showed a large amount of colour-reacting substances (Greenberg's method) in the milk and in the whey. A second series of samples from the same quarters, obtained 8 hours after the first, showed a striking reduction of the acidity and an almost proportional reduction in the number of streptococci. Chemical differences were less sharp but indicated decreased protein breakdown.

Attempts to reproduce the changes *in vitro* showed that, though comparable acidity could not be produced within 8 hours in normal milk, presumably owing to excess of buffer substances, it could be produced in the neutralized secretion of the spontaneous disease, or in milk containing at least 25 per cent. of this.

The acidity is correlated, therefore, with an enormous growth of carbohydrate-attacking streptococci within the udder, in an altered and relatively poorly buffered secretion.—A. W. STABLEFORTH.

HEMMERT-HALSWICK, A. (1933). Zur pathologischen Anatomie der Streptokokkenmastitis des Rindes. [**The Pathology of Bovine Streptococcus Mastitis**].—*Berl. tierärztl. Wschr.* **49.** 114-118. 7 figs. [1 ref.]

The author describes the pathological changes that take place in the bovine udder following infection with *Str. agalactiae*. He divides them into a galactophoritis or inflammation of the sinus and milk ducts and a mastitis or inflammation of the milk secreting alveoli.

In the first case, there is proliferation and desquamation of the cells lining the milk ducts and an escape of polymorphonuclear leucocytes into the lumen. These changes are not uniformly distributed and in some parts it is possible to find no alteration in the tissues.

The changes which occur in mastitis may be acute or chronic. In acute disease the alveolar spaces are enlarged and completely occupied by a cellular exudate mainly composed of polymorphs and also a few epithelial cells. In the

chronic disease the alveolar spaces are rarely occupied by a cellular exudate : the epithelium, however, is deranged and the spaces diminished in size while the connective tissue progressively increases until finally a state of complete fibrosis is reached.—S. J. EDWARDS.

I. KIESSIG, W., & ANGERMANN, W. (1932). Ueber die Diagnose, Verbreitung und Bekämpfung der Streptokokkenmastitis der Rinder. [**On the Diagnosis, Spread and Control of Streptococcal Mastitis of Cattle**].—*Zschr. Infektkr. Haust.* **43.** 59-74.

II. DERRICK, G. W. (1932). **Mastitis.**—*Cornell Vet.* **22.** 333-341.

III. LECLAINCHE, E. (1932). Les mammites de la vache. [**Mastitis in the Cow**].—*Rev. gén. Méd. vét.* **41.** 333-337.

I. Kiessig and Angermann discuss the subject in general, basing their observations on 2,034 cows in 80 herds. Microscopic and cultural methods (broth, litmus milk and blood agar plates), are essential for diagnosis. In general, the degree of infection varies directly with the size of the herd and with increasing age.

The spread of infection cannot be associated with general hygiene or the type of stall, but seems rather to depend upon the milker and his methods, and upon the degree of forcing for high yield. Vaccination is useless for curative purposes (507 cows in 10 herds), whilst no conclusion can be drawn regarding its value in prevention (308 animals in 6 herds, of which at least 6·2 per cent. showed new infections within 6 weeks).

II. Attempts to control mastitis in three herds of 25, 15 and 8 animals respectively during a period of 5 to 12 months by means of clinical examination, strip cup, and a test for reaction (thymbromol). The animals classed as infected were subsequently stalled and milked separately until sold. Of the 32 animals classed as clean, 2 became infected and one became doubtful, but no severe mastitis was noted in any.

III. A brief review of streptococcal mastitis emphasizing its alarming extension in recent years, its insidious character, and the methods by which it may be controlled.—A. W. STABLEFORTH.

PLUM, N. (1933). Statistiske Betragtninger over Miltbrands Forekomst Blandt Husdyrene i Danmark i Aarene 1901-1931. [**Statistical Notes on the Occurrence of Anthrax in Domestic Animals in Denmark in the Years 1901 to 1931**].—*Kgl. Vet.-og Landbohojskoles Aarskr. Copenhagen.* pp. 76-91. 3 tables, 3 charts.

Between 1901 and 1931, 8,268 samples were examined for anthrax with the following results :—

	Cattle	Swine	Horses	Sheep	Dogs	Fowls	Other Animals (deer, wild boar, reindeer).
Positive	2,420	85	21	3	1	0	0
Negative	4,318	807	415	183	7	2	6
Total	6,738	892	436	186	8	2	6

Thus anthrax was positively diagnosed in 2,530 cases.

Mortality in cattle varied from 60·4 to 90·9 (average : 74·3) per cent., in pigs from 9·1 to 88·0 (average : 45·9) per cent.

79 cases of anthrax in human beings were recorded in the veterinary statistics ; 68 of these were butchers, of whom eight died ; 7 were veterinary surgeons, of whom one died ; the other 4 cases all recovered.

With regard to incidence in cattle herds, in 75 per cent. only one animal of the herd was affected.—H. LORENZEN (SONDERBORG).

NOWAKOWSKI, B. (1933). Le charbon (Anthrax) en Pologne. [**Anthrax in Poland**].—*Bull. Off. internat. Hyg. publ.* **25.** 471-476. 3 tables. [1 ref.]

The author has collected details of all the reported cases of anthrax which occurred in human beings in Poland between the years 1921 and 1931 inclusive and has shown by means of tables the percentage mortality, the age incidence, the yearly variation and the distribution amongst the various classes of the community. These aspects are discussed and commented upon.

Of the 727 cases recorded during this period the percentage mortality was 15·7 which agrees closely with figures published for Germany covering the period 1910 to 1921. As might be expected, the incidence is greatest between the ages of 20 and 50 and is strikingly high in that class described as the agricultural group which comprises those workers concerned with the management and breeding of animals and excludes butchers and tanners. This agricultural group contributed 62 per cent. of the total cases.

An instance is cited of 13 people living on the same farm all becoming affected with anthrax after eating the flesh of an infected cow. 10 persons developed cutaneous lesions and recovered, but the remaining three, who were thought to be affected internally, died.—N. S. BARRON.

TOMCSIK, J., & SZONGOTT, H. (1932). Ueber die spezifischen Polysaccharide der Milzbrandbazillen. [**The Specific Polysaccharides of Anthrax Bacilli**]. —*Zschr. Immun.-Forsch.* **76.** 214-234. 5 tables. [12 refs.]

The authors have studied 14 strains of *B. anthracis* including virulent and avirulent strains and attenuated strains with capsules of various extent.

Substances of a polysaccharide nature were obtained which, when diluted up to 1 : 500,000, gave precipitates with anti-anthrax serum and which, when suitably purified, gave, after hydrolysis, 60 per cent. of reducing sugar which on the basis of the osazone test appeared to be *d.* glucose. The nitrogen content of the preparations chiefly used was from 2 to 6 per cent., but by repetition of the acid and alcohol precipitations or precipitation with copper sulphate the nitrogen content was considerably reduced, in one case to 0·8 per cent.

No close connection could be shown between the polysaccharide content and the virulence of the strain, a finding which contrasts with that of SCHOCKAERT.

The polysaccharide substance obtained from non-capsulated strains—in some cases obtained from capsulated strains—contained a much lower proportion of nitrogenous substance than that obtained from capsulated strains. Extracts of the latter contained a considerable amount of a nitrogenous substance precipitable with copper sulphate. It is concluded that the capsule of *B. anthracis* is not polysaccharide, but probably of a protein nature. The purified polysaccharide showed no " aggressin " action.—A. W. STABLEFORTH.

CALMETTE, A. (1932). Robert Kochs Bazillus und die unsichtbaren Elemente des Tuberkulosevirus. [**Robert Koch's Bacillus and the Filtrable Virus of Tuberculosis**].—*Zschr. Tuberk.* **64.** 38-42. [7 refs.]

This paper is a short review of the knowledge that has been gained regarding the filtrable virus of tuberculosis.

Many workers have shown that a filter-passing agent can be obtained either from tuberculous tissue, or from young cultures of the tubercle bacillus grown in a liquid medium, which is capable of setting up a characteristic lesion when the

filtrate is injected into animals. From this lesion acid-fast organisms have been isolated with characters identical to those of the tubercle bacillus.

Calmette and his co-workers have shown that such a filtrate, when inoculated into pregnant guinea pigs, may cause either death of the foetus by intoxication, or hypertrophy of the lymphatic glands. They suggest that the filtrable virus may play a part as a hereditary factor in tuberculosis.

The transformation of the filtrable virus into the bacillary form can be achieved best by the use of repeated injections of an acetone extract of the tubercle bacillus into guinea pigs which have previously received an injection of filtrate.

There are a number of unsolved problems regarding the nature of the ultra-virus. Firstly, the bacilli which appear in the tissues after the inoculation of filtrate are not capable of producing typical lesions unless they have been passaged through a number of animals or stimulated by the action of an acetone extract of the tubercle bacillus. There is also a question of debate regarding the evolution of the virus in culture media.—S. J. EDWARDS.

LANGE, L. (1932). Die Tuberkelbazillen. [**The Tubercle Bacilli**].—*Zlb. Bakt. I. (Orig.).* **127.** 10-25. 1 table.

Since the epoch-making discovery of the tubercle bacillus by KOCH, a great increase in the knowledge of the morphology and biology of this organism has taken place and an outline of the development of this knowledge is given in this paper.

Whilst for the older workers there was only one tubercle bacillus, it was soon appreciated that many variants existed and that with the change in shape there is very often a decrease or a complete loss of acid-fastness. Further, the change in shape is closely connected with the environmental conditions and it appears reasonable to suppose that such changes may be caused through the influence of enzymes, organic extracts, starvation, etc. It must be borne in mind, however, that many apparent variants are really dead or degenerating forms.

The question of the staining of the bacteria and the properties on which the acid-fastness depends is discussed. It is pointed out that the acid-fast substance which is connected with a free hydroxyl group lies not only in the outer covering, but also in the interior of the bacillus. Young tubercle bacilli are not acid-fast. There is evidence that a relationship exists between acid-fastness and virulence and that there is a connection between high grade acid-fastness and pathogenicity.

In work with tubercle bacilli, it is essential to realize the type of bacillus under observation. The type may be recognized by a consideration of the morphological, staining and cultural characters of the organism and in most cases a fairly correct idea may be obtained. Without, however, inoculations into rabbits, or better still cattle, it may be difficult to arrive at a definite conclusion. The change in the pH of the media which takes place during growth, although greatly influenced by the composition of the media, may give some indication of the type of bacillus under cultivation. With human bacilli, as opposed to bovine, after about the 14th day the reaction changes from the alkaline side to the acid.

An account is given of the variants arising in human strains of tubercle bacilli, and the serological divisions of mammalian tubercle bacilli as seen from agglutination and complement-fixation tests, are discussed. In conclusion, consideration is given to the virus said to be associated with tubercle bacilli and, in spite of all objections to such a theory, the author is not yet convinced that the matter has been finally settled.—A. J. WILSDON.

I. VANDESTRATE, M. (1932). Essais de culture de Bacilles tuberculeux en suspension dans la bile. [**Experiments on the Cultivation of Tubercle Bacilli suspended in Bile**].—*C. R. Soc. Biol. Paris.* **111.** 264-266. [1 ref.]

II. ARMAND-DELILLE, P., & GAVOIS, H. (1932). Caractères et virulence d'un Bacille tuberculeux humain isolé du sang par la méthode de Löwenstein. [**Character and Virulence of a Human Strain of Tubercle Bacillus isolated from Blood by Löwenstein's Method**].—*Ibid.* 580-582. [1 ref.]

I. Vandestrate found that in direct cultivation on Löwenstein's medium of tubercle bacilli suspended in bile growth was inhibited in the lower part of the tube where the bile collected in thick layers, and it was essential therefore to use a small amount of inoculum.

Preliminary treatment of the bile with sulphuric acid (one part of bile to 3 parts of 10 per cent. sulphuric acid) prevents the development of contaminants, but for the cultivation of tubercle bacilli the results were inferior to those obtained with untreated bile. For the cultivation of tubercle bacilli from bile he recommends diluting the bile to one half with distilled water and, after centrifuging, treating the deposit with sulphuric acid.

II. Armand-Delille and Gavois have confirmed the value of Löwenstein's method for the isolation of tubercle bacilli from the blood ; the percentage of positive results obtained was, however, considerably less than that recorded by LÖWENSTEIN. One strain of tubercle bacillus isolated from the blood of a child was proved by its cultural appearances and by biological tests to be a typical virulent human strain.—T. M. DOYLE.

I. JORDAN, L. E. (1932). **An Attempt to grow Tubercle Bacilli within the Single-Celled Organism Colpidium campylum.**—*J. Infect. Dis.* **51.** 482-488. [12 refs.]

II. PRICE, R. M. (1932). **The Influence of Silica upon the Growth of the Tubercle Bacillus.**—*Canad. J. Res.* **7.** 617-621. 1 plate, 1 table. [6 refs.]

III. WANGLIANG. (1933). Sur les substances activantes pour la culture du Bacille tuberculeux. [**Activating Substances in the Cultivation of the Tubercle Bacillus**].—*C. R. Soc. Biol. Paris.* **112.** 429-431. 1 table. [4 refs.]

I. It has already been shown that tubercle bacilli may multiply within mononuclear cells ; also that glycerol favours the growth of the bacillus *in vitro.* Following these facts, the author has attempted to obtain multiplication of both mammalian and cold-blooded tubercle bacilli within the cell of the ciliate *C. campylum* in glycerinated and non-glycerinated media. Although the bacilli were ingested by the ciliates, no multiplication was observed.

II. Compounds of silicon incorporated in the culture media enhance the growth of tubercle bacilli ; apparently the more soluble the silicon compound, the greater the degree of growth stimulation. This suggests that a similar factor may account for the rapidly progressive tuberculosis that frequently terminates silicosis in man.

III. Yeast extract, or tomato-juice, in a proportion of 2 to 4 per cent., will stimulate the growth of tubercle bacilli in liquid media, but not on solid media. Hunton's hormone broth gives a more profuse growth than glycerol broth and 10 per cent. of a filtrate of an old tubercle culture added to glycerol broth also favours better growth.—NORMAN HOLE.

WULFF, A. (1932). Die Bedeutung des Hohnschen Z-Einährbodens für die Züchtung und Typenbestimmung der Tuberkelbakterien. [**The Value of Hohn's Z-Egg Medium for the Cultivation and Typing of Tubercle Bacilli**]. —*Inaug. Diss. Cologne.* pp. 15. [31 refs.]

It is concluded that Hohn's Z-egg medium which contains haematin and malachite green is not preferable to the media used by him earlier. HOHN's statement that type differentiation is facilitated by making a thick streak about 1 cm. above the condensation water of a fresh tube of egg medium with a very young culture is confirmed.—A. W. STABLEFORTH.

ASCOLI, A. (1932). L'anachorèse du bacille tuberculeux. [**Anachoresis of Tubercle Bacilli**].—*Rev. Tuberc.* **13.** 5-11. 1 fig., 1 table. [12 refs.]

The term anachoresis has been used for the phenomenon whereby bacteria are attracted to the local lesion produced by BCG and are there destroyed. It is now determined that virulent tubercle bacilli are attracted to the local lesion and are subject to the destructive action there. It appears to be a general inflammatory process manifesting itself in two ways, first the attraction of bacteria and secondly, their destruction. The suggestion is put forward that the tubercle bacilli which have been noted by certain workers in local lesions produced by BCG may not have originated in the vaccine, but that they may have been circulating near to the point at which BCG is developing its action and have been attracted thither.
—R. LOVELL.

RAUTMANN, H. (1933). Eine Auswertung der klinisch-bakteriologischen Tuberkulosefeststellung im Vergleich zu den biologischen Ermittelungsverfahren. [**The Value of Clinical-Bacteriological Diagnosis of Tuberculosis compared with Biological Tests**].—*Zschr. Infektkr. Haust.* **43.** 279-314. 9 tables. [16 refs.]

105 cattle were chosen at random at Leipzig abattoir and different veterinarians each carried out a particular examination for evidence of tuberculosis, by clinical methods, microscopic examination of lung mucus, animal inoculation, ophthalmic tuberculin tests and complement-fixation tests ; finally, all the animals were examined *post mortem.*

The results of the various methods of examination thus obtained independently were then examined collectively. The results are shown and the nature of the infection in the different animals is indicated, the types being divided into five grades according to the severity as revealed *post mortem.* The relative reliability of the various tests is then compared.

Tuberculosis was found in 77 cattle but in 29 was limited to lymph glands. There was pulmonary infection in 76 cases.

Lung mucus tests proved very reliable in detecting open thoracic tuberculosis ; clinical examination gave 31 per cent., tuberculin tests 32 per cent., and complement-fixation tests 50 per cent. of error.

The results of these tests are compared and analysed and afford valuable information on the subject of tuberculosis diagnosis.—F. W. MÜLLER (BERLIN).

NIEBERLE, K. (1932). Die Tuberkulose der Haustiere. [**Tuberculosis of Domestic Animals**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 49-58.

In this paper an account is given of the present knowledge of tuberculosis in domestic animals. It is pointed out that the disease varies greatly in different species of animals and for this reason it is wrong to draw conclusions from the behaviour of the tubercle bacilli in the human body and apply them to animals. It is not generally appreciated, however, that at times in animals, as in man, an inflammatory exudate may be produced.

The author deals with the problem of tuberculosis in horses, cattle, pigs, dogs, cats and fowl, under the following three headings :—the general action of

the bacillus in the body, the route of infection and finally the course of the disease. The macro- and microscopic appearances of the lesions in such positions as the lymph glands, spleen, liver, lung and intestine are described. It is pointed out that, in cattle, infection may occur by inhalation or ingestion and that, occasionally, tuberculosis may be present at birth in which case the spread of the bacilli is usually by way of the blood stream. In cases of tuberculosis by ingestion, ulcers may be found on the mucous membrane of the small intestine without changes in the associated lymph glands. In such cases, macro- and microscopic changes may be seen in the liver and spleen and the bacilli can usually be recovered from the latter organ. In horses and pigs, the route of infection is always by ingestion and the spread of the bacilli through the body more commonly takes place through the lymph stream. In dogs and cats, infection occurs more commonly by inhalation, but occasionally it may take place by the ingestion of infected meat ; this is also true for hens, in which birds the bacilli are usually carried throughout the body by way of the blood stream.

Finally, chronic tuberculosis is discussed with special reference to the mammary gland. In this organ lymphatic metastasis may not be present and, in a number of cases, there is a diffuse infiltration of one or more quarters of the gland with no formation of definite tubercles. The possibility of its clinical recognition in such cases is, therefore, limited.—A. J. WILSDON.

HARNACH, R. (1932). Tuberkulosa skotu v CSR. za desítiletí 1921-1930 a její hodnocení podle statistických nálezu na jatkách. [**Bovine Tuberculosis in Czechoslovakia during the Ten Years 1921-1930 according to Statistical Data collected in Slaughter-Houses**].—*Klin. Spisy. Skoly Zverol. Brno.* **8.** 121-152. 1 fig., 2 tables, 2 charts. [Summary in French : abst. from orig.]

The average number of cattle found at *post-mortem* examination in slaughter-houses to be affected with tuberculosis was, during the period 1921-1930, 2·83 per cent. The highest number of tuberculous cattle was recorded in the year 1924 (3·84 per cent.) and the lowest in the year 1921 (2·18 per cent.). After elimination of the figures for calves from these data, the average percentage of tuberculous cattle increased to 5·55 per cent. Tuberculin tests showed the average number of reacting cattle to be 15·8 per cent. ; in some herds 88 per cent. of the cattle reacted. Lesions were found in the following sites :—in 69·82 per cent. in the pleural cavity, in 1·34 per cent. in the abdominal cavity, in 15·17 per cent. in both cavities, in 2·31 per cent. in the lymph glands, in 1·32 per cent. in the mammary gland, in 0·11 per cent. in the testicles and in 1·16 per cent. in other organs.

—E. PRIBYL (BRNO).

PLUM, N. (1933). Primaer Uterustuberkulose hos en Ko samt Tilfaelde af Vulvatuberkulose. [**Primary Uterine Tuberculosis in a Cow together with Cases of Vulvar Tuberculosis**].—*Maanedsskr. Dyrl.* **44.** 649-661. 3 figs.

In a previous paper on primary vulvar tuberculosis in cows [(1932). *Maanedsskr. Dyrl.* **44.** 337.] Plum described five cases of primary vulvar tuberculosis, one being associated with tuberculosis of the cervix. The last case is supposed to have originated from an obstetrical infection. In the same herd a cow with primary genital tuberculosis was observed, possibly infected at the same time as the other two cows. This was a case of primary uterine tuberculosis in a four-year-old cow. At autopsy, tuberculosis of the uterus, lumbar and sacral lymph glands and of the deep and superficial inguinal lymph glands, was noted, but no tuberculosis of the lungs or elsewhere.

In this paper the author records seven more cases of vulvar tuberculosis

in cows. Four of them represent a secondary infection, possibly from a tuberculous uterus through lesions of the vulva after parturition. This was evident in one case where the disease was diagnosed about six weeks after parturition. The animal, a heifer, had dropped a calf with congenital tuberculosis and thereby contracted traumatic lesions of the vulva and vagina, by extension from a tuberculous metritis.

In two other cases the vulvar tuberculosis was no doubt a primary one. In one of these cases, infection seems to have taken place through contact with the bull. Three more cases of vulvar tuberculosis were observed in the same herd; the bull showed a greatly enlarged testicle.

Genital tuberculosis in cows appears often to be unassociated with infection of the corresponding lymph system.—H. LORENZEN (SONDERBORG).

WERDELIN, C. (1933). Et Tilfaelde af tuberkuløs Kastning hos So, foraarsaget af Fjerkraetuberkelbakterier. [**A Case of Abortion in a Sow caused by Tubercle Bacilli of the Avian Type**].—*Maanedsskr. Dyrl.* **45.** 52-59.

Material from the placenta of a sow that had aborted was sent for examination. Numerous tubercle bacilli were found and on closer examination they proved to be of the avian type. The sow was killed and tuberculous lesions were found in the uterus, the lumbar glands, the glands of the mesentery and in the lungs. The infection is supposed to have taken place through the alimentary canal.

—H. C. BENDIXEN (COPENHAGEN).

SMITH, H. R. (1932). **Progress in Controlling Avian Tuberculosis as Indicated by Effect on Hogs.**—*U.S. Egg & Poultry Mag.* **38.** No. 2. 23-25 and 62. 3 photographs.

In Michigan State, where tuberculosis control amongst poultry farmers is efficient, the annual condemnation of hogs at the slaughterhouses has fallen from 22·9 per cent. in 1924 to 14·4 per cent. in 1931. Similar cases in other states are cited.

The methods of control comprise hygienic poultry farming and the disposal of laying birds after only one year's use. Tuberculin testing is chiefly of use in breeding flocks. The author considers that tuberculosis control in cattle is less important than control in fowls in lowering the incidence of this disease in pigs.

It is suggested that the percentage of condemned hog carcasses might be taken as an index of tubercle infection of poultry in the district from which the hogs were drawn.—E. J. PULLINGER.

I. LANGE, Bruno. (1932). **The Role played by Bovine Tubercle Bacilli in Human Tuberculosis.**—*Brit. Med. J.* Sept. 10th. 503-506. 1 table. [Paper presented at Discussion in the Section of Tuberculosis at the Cent. Meet. of the Brit. Med. Ass., London, 1932].

II. —. (1932). **Bovine Bacillus in Human Tuberculosis.**—*Ibid.* Aug. 13th. 316-317.

I. The author has carried out in Germany at the Robert Koch Institute investigations parallel to those which have been carried out in Great Britain. Figures are given showing that the percentage of bovine infections in human beings in Germany is less than those found in Great Britain. Of 40 cases of pulmonary tuberculosis amongst milkers and stable boys, 8 cases were found to be expectorating bovine bacilli. The author believes that the bovine type is to be found as the cause of tuberculosis of man in its most varying forms, that the menace of bovine infection is much greater in children than in adults and that

the distribution of bovine infection differs in no slight degree in different countries. The latter he attributes to the varying extent of distribution of the disease in cattle and the degree of hygiene maintained in the milk supply of the population. In general the author's findings bear out those of A. S. GRIFFITH and other investigators in Great Britain. An interesting statement is made that the practice of regularly boiling milk for private consumption, especially in the case of milk intended for children, is quite common in Germany.

II. This publication gives an account of the discussion following upon the papers by A. S. GRIFFITH and Bruno LANGE. No new facts of importance seem to have been elicited during the course of the discussion. FRASER said that, although less than 1 per cent. of cows suffered from tuberculosis of the udder, there seems no reason why the cow suffering from generalized tuberculosis should not give tuberculous milk. MUNRO gave his figures for the Glenlomond Sanatorium where it was found that the bovine type was present in 20 per cent. of cases of human pulmonary tuberculosis, in 26 per cent. of bone and joint tuberculosis and in 33 per cent. of cervical glandular lesions, and remarked on the danger of considering a bovine organism to be less virulent for human beings than the human type.—S. H. GAIGER.

BENDIXEN, H. C. (1932). **On the Corynebacteria occurring in Milk from clinically Normal Cow Udders.**—*Transactions of the Fifth Scandinavian Pathological Congress.* Held in Lund, Sweden. July 3rd-6th, 1932. Suppl. 11. *Acta Path. et Microbiol. Scand.* pp. 187-191.

The author examined 288 samples of milk from single quarters of 73 cows in 6 herds. Of these, 31·9 per cent. showed streptococci, 13·9 per cent. micrococci, 23·3 per cent. corynebacteria, 9·4 per cent. corynebacteria and other bacteria, 2·8 per cent. *Br. abortus* and 18·4 per cent. no organisms. The corynebacteria, which caused little or no disturbance, were demonstrated microscopically in centrifuged deposit from 7·9 per cent. of samples. They were only weakly Gram-positive, but in smears made from milk were relatively acid-fast and often indistinguishable from tubercle bacilli.

Corynebacteria were cultivated from 82 of the quarters, in 77 cases in pure culture. These strains were further examined and compared with corynebacteria from other sources, bovine, human or avian. 71 of the author's strains, which he calls type A, were alike and similar to *Bact. lipolyticus* (Evans). He suggests that this name should be given up and prefers the term udder-corynebacteria.
—A. W. STABLEFORTH.

I. BISHOP, Lucille M. (1932). **Study of an Outbreak of Pseudotuberculosis in Guinea Pigs (Cavies) due to B. pseudotuberculosis rodentium.**—*Cornell Vet.* **22.** 1-9. 3 figs. [27 refs.]

II. PALLASKE, G., & MEYN, A. (1932). Ueber die Pseudotuberkulose (Bact. pseudotub. rodentium) bei Katzen. [**Pseudotuberculosis** (*Past. pseudotuberculosis*) **of Cats**].—*Deuts. tierärztl. Wschr.* **40.** 577-581. 4 figs. [8 refs.]

III. SAENZ, A., & COSTIL, L. (1932). Diagnostic de la pseudo-tuberculose du Cobaye par l'intradermo-réaction aux corps microbiens. [**Diagnosis of Pseudotuberculosis in the Guinea Pig by an Intradermal Reaction with Bacterial Bodies**].—*C. R. Soc. Biol. Paris.* **111.** 573-574.

I. An outbreak of pseudotuberculosis in guinea pigs due to *Past. pseudotuberculosis* (*B. pseudotuberculosis rodentium*) is described. The author draws attention to the possibility of confusion which might arise between lesions caused by this organism and infection of guinea pigs with *Br. abortus*. Previous investi-

gators have suggested similarity with plague, tuberculosis and even lesions produced by glanders or tularaemia. Six strains of *Past. pseudotuberculosis* were isolated and suspensions were inoculated both intraperitoneally and subcutaneously into fresh guinea pigs. By varying the dosage and route it was possible to produce different types of infection. Large doses intraperitoneally produced death with a fibrinous peritonitis in 5 to 6 days. Large doses subcutaneously produced death in 12 to 14 days with abscess formation, lymph gland enlargement and nodular lesions in the liver and spleen. Small doses subcutaneously would not produce death, but if necropsy was performed 8 to 10 weeks later, nodules of the liver and spleen were observed, but little or no glandular involvement. It was not found possible to infect 6 chickens and one cat ; rabbits were infected with some difficulty.

II. It is recorded that 12 cases of pseudotuberculosis in cats have been met with at the Veterinary Pathological Institute at Leipzig. Three cases were in males and 9 in females. Their ages varied from 18 months to 8 years. Previous to death the cats were reported to have been ill for 8 to 14 days to 3 to 4 weeks.

Lesions were present in the liver and spleen and the macroscopic and microscopic pathological findings are described. The causal organism was isolated and is considered to be identical with that commonly causing pseudotuberculosis in rodents and birds (*Past. pseudotuberculosis*). The question of the source of infection is raised and consideration is given to the fact that cats do not live in herds as rodents, but there is the possibility of infection from consuming infected rodents such as mice.

III. The authors claim to be able to separate affected guinea pigs during an epidemic of pseudotuberculosis by a skin reaction following an intradermal injection of the dead bodies of the causal organism. The inoculum consists of 0·1 c.c. of an emulsion prepared by growing the organism on agar for 6 days, washing off the growth with saline and treating the suspension with formalin to a concentration of 0·3 per cent., after which it is allowed to stand at 37°C. for 15 days. The opacity is then adjusted to 1 cg. per c.c. A positive reaction consisted of a discoloured oedematous area with a necrotic centre, which persisted for several days. Controls exhibited a slight papule at the point of inoculation which disappeared after about 2 days.—R. Lovell.

I. Dickinson, C. G. (1932). **Chronic Abscess Formation in Liver of Calf Due to Infection by Corynebacterium pyogenes.**—*Austral. Vet. J.* **8.** 151-153. [4 refs.]

II. van Heelsbergen, T., & Clarenburg, A. (1932). Apathogene Diphtheriebakterien beim Kalbe. [**Non-Pathogenic Diphtheria in a Calf**].—*Deuts. tierärztl. Wschr.* **40.** 551-552.

I. The liver was from a calf weighing about 100 lb. and weighed 12½ lb. Its surface was studded with raised fibrotic nodules up to ¾ inch in diameter, and innumerable similar lesions were present throughout its substance. They were usually spherical and contained a small purulent centre with a thick fibrotic wall, but in many parts were confluent. The pus showed short, thin, Gram-positive bacilli whose characters, which are detailed, were those of *C. pyogenes*.

Dickinson suggests that infection took place at the umbilicus.

II. The strain was isolated from the blood of the calf at *post-mortem* examination but, although not clearly distinguishable from *C. diphtheriae* in other ways, was non-pathogenic for guinea pigs (toxin or whole culture) and for another calf.—A. W. Stableforth.

DAYUS, C. V., & HOPKIRK, C. S. M. (1932). **Control of Caseous Lymphadenitis in Sheep.**—*New Zealand J. Agric.* **45.** 1-9. 4 figs., 4 tables.

This is a general article in which the authors give details of methods which they advocate for controlling caseous lymphadenitis in sheep in New Zealand. If such methods were systematically applied they see no reason why "caseous lymphadenitis in New Zealand should not be still further decreased, if not ultimately completely eradicated."

Amongst the steps to be taken are the annual palpation of the glands of all sheep, two-tooth and upwards, with subsequent segregation of those affected and the systematic disinfection of shearing sheds and apparatus used for shearing.

The authors also note that the incidence of the disease is greater in machine-shorn than in blade-shorn flocks, machine-shearing causing more cuts and abrasions than blade-shearing.—GWILYM O. DAVIES.

I. NÉVOT. (1932). La présence du bacille de rouget dans les arthrites du mouton. [**The Occurrence of** *Erysipelothrix rhusiopathiae* **in Arthritis of Sheep**].—*Rév. gén. Méd. vét.* **41.** 740-745. [10 refs.]

II. DINDINAUD, R. M. E. (1932). Variabilité des formes cliniques du rouget. Diagnostic thérapeutique. [**Variability of Clinical Forms of Swine Erysipelas**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 92. [47 refs.]

I. PANISSET, in 1922, drew attention to the variety of conditions attributable to *Erysipelothrix rhusiopathiae*, collecting from literature instances of infection in fowls and other birds, cows, sheep, lambs and human beings. Since that time numerous observations have been published. CARRÉ, in 1931, recorded the existence of this condition in sheep in France for the first time, expressing the view that the infection might be found to be of frequent occurrence. [CORNELL and GLOVER described this organism in cases of arthritis in lambs in Britain in 1925].

Névot records his observations on the carcasses of sheep sent for sale in Paris and previously subjected to veterinary inspection, a procedure which probably eliminated some infected carcasses. In the first 3 months of 1932, 12 carcasses suspected to be infected with *Erysipelothrix* polyarthritis were found, of which 6 were examined bacteriologically, 2 yielding pure cultures of the organism. Infected unopened joints may appear little altered, sometimes a little hypertrophied and the neighbouring muscles emaciated. There is present a vegetative synovitis which does not cause an increase in the quantity of synovia. The synovia remains clear and microscopic examination of it gives negative results. The author used ascitic broth for obtaining cultures and identified his organism by serological tests and the inoculation of pigeons.

II. This thesis gives an excellent and very full account of *Erysipelothrix rhusiopathiae* infections as met with by the author in France. The well-known septicaemic, cutaneous and chronic forms of the disease in pigs are described, together with atypical clinical forms as met with by the author, an account being given of their origin, diagnosis, prevention and treatment. 14 pages are devoted to a review of the literature upon infections by this organism in mammals other than the pig, and in birds. Emphasis is laid upon the need always to keep in mind, when dealing with pig ailments, the possibility of infection with this organism and the unreliability of a mere clinical examination in arriving at a diagnosis.
—S. H. GAIGER.

BIELY, J., & ROACH, W. (1932). **Comparison of Repeated Rapid Whole-Blood, Rapid Serum and Tube Agglutination Tests for the Diagnosis of** *S. pullorum* **Disease.**—*J. Comp. Path. & Therap.* **45.** 224-229. 3 tables. [4 refs.]

Four tests were made at monthly intervals for *Bact. pullorum* infection on 110 year-old fowls by the whole blood, rapid serum and tube agglutination tests. The percentage of agreement in diagnosis was 91·3 per cent. by all 3 tests ; 93·8 per cent. by the whole blood and rapid serum tests ; 94·7 per cent. by the rapid serum and tube tests and 93·6 per cent. by the whole blood and tube tests.

The percentage of agreement of the four repeated tests by the same agglutination test was :—whole blood test, 94·5 per cent. ; rapid serum test 97·5 per cent. and tube test 97·7 per cent.

The high percentage of agreement obtained in a comparison of the whole blood, rapid serum and tube tests and the constancy of diagnosis of the four tests by each agglutination test shows that all 3 tests are reasonably comparable and constant in diagnosis.—NORMAN DOBSON.

ANDREWS, W. H. (1932). **Vaccination against Bovine Contagious Abortion and the Relation of this Disease to Undulant Fever in Man.**—*Vet. Rec.* **12.** 1217-1239. 7 tables. [27 refs.]

This article and the ensuing discussion are unsuited to abstraction, but should be read in the original.

Andrews gave the position as it appeared to him and his views are probably correctly reflected in the following quotations :—

" The ideal procedure is undoubtedly to eradicate the infection from a herd . . . . . it is feasible and may be expected to confer considerable benefits on the owner. It is also beneficial to the community. . . . . In connection with a large proportion of the herds in this country, it appears at present to be impossible to apply the ideal method of eradication by isolation. It also seems certain that at present we cannot expect effective help from any medicinal treatment, nor from the use of any dead vaccine, and that sanitary measures are insufficient. We are therefore justified in employing living cultures if there is any evidence that the method is successful, and unless it can be shown to have some definite injurious effect."

He believed that such vaccination was of real economic value and that the objections that it causes sterility, encourages the spread of the disease, or increases the risk of human infection were unfounded.

Opening the discussion MINETT agreed that " on the whole, vaccination, carried out at the appropriate time, does not have the effect of preventing abortion in a substantial percentage of cases." He noted, however, the striking variability of the figures available, and questioned its simplicity as a method of attack if it was to be carried out at the proper time. He concluded as follows :—" Largely because I feel the method to be wrong in principle and, also, because I am optimistic regarding alternative methods of control, I feel strongly opposed to the wholesale application of living, more or less virulent, vaccines even in infected herds." At the most he would look upon vaccination as a temporary expedient, pending segregation and the rearing of young stock under conditions in which they would not be exposed to infection.

G. S. WILSON gave a summary of 136 cases of undulant fever in Great Britain and Ireland dealing with distribution, age, place of residence, occupation, yearly incidence, association of undiagnosed pyrexia and agglutination of *Br. abortus*, and the method of infection. He calculated that probably 500 cases of undulant fever occur annually in England and Wales and believed that milk or cream was the usual vehicle of infection.

DALRYMPLE-CHAMPNEYS referred to 83 cases of undulant fever, which had been notified to him at the Ministry of Health. The average titre of the first 50 of these was 1 : 2,000. Of the 83 cases, 20 were believed to have been conveyed by milk and 12 were probably due to direct contact, whilst in the remaining cases it was not possible to reach any definite conclusion, although in many milk seemed

to be the most likely source of infection.

Other speakers also referred to the cost of testing and the interval necessary between tests, to the diverse virulence of strains and to the necessity of carrying out blood tests before resorting to vaccination.—A. W. STABLEFORTH.

BELLER, K., & STOCKMAYER, W. (1933). Experimentelle Untersuchungen über die Empfänglichkeit des Huhnes für die Infektion mit Bakterien aus der Brucella-Gruppe. [**Investigations into the Susceptibility of Hens to Infection with Members of the Brucella Group**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 456-467. 5 tables. [13 refs.]

Inoculation of fowls with bovine and porcine strains of *Br. abortus* produces a very rapid response, specific agglutinins rising in titre by the 4th day. All the usual routes of inoculation produce response, but the subcutaneous route causes the most active reaction. Feeding of cultures is also followed by a rise of agglutinins. [Almost all the fowls used showed a serum titre of 1 : 20 to 1 : 160 prior to the commencement of the experiment. This is surprising and suggests the possibility of infection of the healthy stock with brucella organisms, or possibly the non-specific precipitation often seen in low dilutions of fowl serum was being read as specific agglutination].—E. J. PULLINGER.

I. DIERNHOFER, K. (1933). Molken-, Milchserum- und Milchagglutination als Hilfsmittel zur Feststellung der Brucellabesiedelung des Kuheuters. [**Whey, Milk-Serum and Milk Agglutination as Aids to the Determination of Brucella Infection of the Cow's Udder**].—*Wien. tierärztl. Mschr.* **20.** 97-105. 2 figs., 1 table. [13 refs.]

II. SCHURNAKOWA, M. A. (1933). Die beschleunigte Methode der Agglutination nach Noble zur Diagnostik des seuchenhaften Verwerfens des Rindes bei der Infektion mit Brucella abortus (Bang) und deren Anwendbarkeit zur Massendiagnostik. [**The Accelerated Method of Agglutination of Noble for the Diagnosis of Contagious Abortion of Cattle due to** *Br. abortus* (**Bang**) **and its Use for Routine Diagnosis**].—*Deuts. tierärztl. Wschr.* **41.** 214-215. 1 table, 1 graph. [5 refs.]

I. The preparation of whey for the ordinary agglutination test for milk can be hastened and improved by shaking the rennet clot with chloroform, as soon as it is formed, and centrifuging at high speed. Milk-serum prepared with lead acetate or copper sulphate can also be used, but gives slightly lower titres. Details are given of both methods.

A drop method carried out on slides with undiluted whole milk and a thick bacterial suspension is also described ; its value is compared with that of the ordinary incubator method using whey. From the results obtained with 200 samples, the author concludes that the drop method is not only particularly rapidly and easily carried out but gives results which are in a high degree reliable. It also has the advantage that it can be carried out under the conditions of country practice and is, therefore, especially valuable for the detection of brucella infection of the udder in newly purchased animals.

II. Noble's method is carried out by mixing 0·1 c.c. of serum in one-tenth of the usual dilutions, e.g. 1 : 2·5, 1 : 5, 1 : 10, with an equal volume of an antigen suspension 4 to 5 times thicker than is usual, shaking for a few minutes, making up to the usual volume by addition of saline and reading at once. The actual reaction is thus hastened but readings are made with a suspension of normal density.

Schurnakowa has compared the results of Noble's method with those of

the ordinary method in the case of 1,000 sera. The rapid method gave results which agreed well with the clinical and epizootiological findings. It picked out 6 per cent. more of the infected animals, and gave less positive reactions in disease-free herds. The number of doubtful reactions was reduced by 70 per cent.

Old sera or sera which have been frozen once or twice show a higher titre by the rapid method. Its sensitivity also makes it suited to daily titration of the serum of artificially infected animals. Apart from its speed, it can be carried out in places where it would be impossible to carry out the usual incubator method.
—A. W. STABLEFORTH.

MAGALLON, P., & VIDAL, L. F. (1933). Quelques cas de fièvre ondulante d'origine bovine à "Brucella Melitensis." [**Some Cases of Undulant Fever of Bovine Origin,** *melitensis* **Strain**].—*Rev. gén. Méd. vét.* **42.** 257-262. 2 tables. [5 refs.]

Two instances are recorded which, in the opinion of the authors, indicate that cattle infected with *Br. melitensis* by contact with goats and sheep can in turn contaminate man. They consider that undulant fever due to *Br. melitensis* of bovine origin, which appeared to be rare in France, may prove to be a real danger, the future extension of which cannot be estimated.—LL. E. W. BEVAN.

LOMBARDO-PELLEGRINO, P. (1932). Sulla "brucellosi da melitense" in Messina. (Inchiesta sanitaria. Osservazioni). [*Brucella melitensis* **Infections in Messina**].—*Ann. Ig.* **42.** 209-220. [7 refs.]

The following notes were collected during an outbreak of human *Br. melitensis* infection in Messina and the surrounding territory (567 cases, of which 21 were fatal). In 44 per cent. of cases it could be demonstrated that the disease was not contracted by drinking infected milk. In a particular village of 1,300 inhabitants, 21 cases of infection could be traced to the presence of a convalescent from undulant fever. It was also noted that the goat breeders were the least infected. The goats of the infected area were systematically inspected by a veterinarian and did not show temperature reactions or signs of illness, while in serological tests the milk gave 5 positive cases only out of 300 tested samples.

The author points out that goat breeders of this territory usually destroy goats or sell them to the butcher if they show signs of illness, loss of milk yield or abortion; hence the scarcity of clinical cases in the goats. The milk of the 5 positive tests came, according to the author, from goats that were not noticed by the owner as being ill; these from the prophylactic point of view are the most dangerous ones.

Fowls became infected when inoculated. Mosquitoes (*Culex pipiens*) showed virulent *Br. melitensis* 24 hours after sucking the blood from infected human beings.

Serum from men agglutinating *Br. melitensis* also agglutinated *Br. abortus* in 14 per cent. of tests. Serum from goats agglutinating *Br. melitensis* also agglutinated *Br. abortus* in 11 per cent. of the tests.—F. VEGLIA (TURIN).

CHOUFOUR, J. C. (1933). Eenige beschouwingen over de bestrijding van septichaemia-epizootica in Bantam middels prophylactische vaccinatie. [**Some Views on the Treatment of Haemorrhagic Septicaemia in Bantam by Prophylactic Vaccination**].—*Ned.-Indisch. Blad. Diergeneesk.* **45.** 44-61. 7 tables, 1 chart.

The results obtained with systematic vaccination against this disease during 1930 to 1932 were definite. It appeared that in an average of 3 years, only 57 out

of 31,000 buffaloes succumbed annually ; during an earlier period, 1923 to 1929, this number averaged 236 annually. The vaccination, which gives an immunity of about 5 months duration, is recommended on condition that nearly all animals in the infected district are treated. The symptoms of shock following vaccination, previously described, are referred to. They are probably due to the use of unsuitable bacterial strains. These symptoms could sometimes be arrested by the prompt intravenous injection of 5 to 10 c.c. of a 1 : 1,000 adrenalin solution.

—A. Klarenbeek (Utrecht).

Piening, C. (1932). Infektion mit dem Novyschen Bazillus des malignen Oedems (Bac. oedematiens) bei einem Schwan. **[Infection with Novy's Bacillus of Malignant Oedema** (*Clostridium oedematiens*) **in a Swan]**.—*Deuts. tierärztl. Wschr.* **40.** 466-469. 3 figs. [5 refs.]

The bird was one of two living on a small lake in Berlin. On the day prior to death it showed dullness, uncertainty of gait and, later, paralysis and drooping of the wings, the head resting on the ground with the eyes closed.

Post-mortem examination was carried out 24 hours after death. Macroscopically the picture suggested a septicaemia. The liver appeared to be in a condition of parenchymatous degeneration and there was slight enlargement of the spleen. In the substance of the brain clear circumscribed centres about the size of a pin-head were found. As haemorrhagic encephalitis producing symptoms of paralysis had occurred frequently before on the same premises it was thought that this was probably a similar case. For this reason no minute examination was made of the organs, attention being concentrated on the brain. Examination of sections showed that the organism occurred in large masses in the vessels, actually occluding some of them. It had, however, also invaded the brain substance and the ventricles. The clear centres were found to be actual cavities which had contained gas. They possessed no special wall. The author states that it is improbable that this was a *post-mortem* change because there was marked hyperaemia, and regressive changes were to be found in the ganglion and glia cells. These changes were most pronounced in the neighbourhood of the bacillary masses. Many of the ganglion cells could be shown to be crowded with fat-droplets.

Cl. oedematiens was recovered in pure culture from the heart blood—the identification being based upon Zeissler's description. Two fowls inoculated with culture rapidly developed symptoms and died in 36 hours. The lesions and the histological changes found were in close agreement with those occurring in the swan. The liver, however, contained large numbers of necrotic centres of microscopic size. Special attention is drawn to the fact that the capillary endothelium in these centres was quite normal in appearance.—A. Leslie Sheather.

I. Sommer, H., & Sommer, Elizabeth W. (1932). **Botulinus Toxin. VI. The Destruction of Botulinus Toxin by Heat.**—*J. Infect. Dis.* **51.** 243-253. 13 tables, 1 chart. [13 refs.]

II. Burrows, W. (1932). **Growth of Clostridium botulinum on Casein Hydrolysate and on Hydrolysate Preparations.**—*Ibid.* 298-308. 3 tables. [12 refs.]

I. This article is one of a series dealing with the behaviour of botulinus toxin towards various physical and chemical influences.

These authors found that toxins are most stable to heat at pH 5 when prepared by adsorption on aluminium hydroxide. They are unable to define the optimum pH for the stability of purified toxins dissolved in a solution of an amino-acid mixture or of crude toxin filtrates. An optimum pH 5, however, is considered to indicate purity of the toxin preparation. Aminoids and milk do not retard the

thermal destruction of the toxic substances at pH 5, while buffer solutions containing trivalent anions assist the inactivation by heat at pH 5 and 7. The time taken for the destruction of the toxins in different fruit and vegetable juices of the same pH value is very variable. The rate of destruction increases approximately 10 times if the temperature is raised 10°C. and purification of the toxin in no way increases the thermal stability of the active principle.

II. This investigation was undertaken to compare the growth of various strains of *Cl. botulinum* (types A and B) in as many individual amino-acids as possible. It was found that arginine was not of importance, while flavianic acid did not interfere with the growth of *Cl. botulinum*. When solutions of casein hydrolysate were adsorbed on norite or on Seitz-Werke pads, no growth was obtained. Tryptophane was necessary in a medium in which the source of nitrogen was an acid hydrolysate of casein. The author was unable to detect cultural differences on these media between types A and B cultures of *Cl. botulinum*.

—A. J. Wilsdon.

Boivin, A., & Mesrobeanu, Lydia. (1933). Contribution à l'étude de la composition chimique des Bactéries. Action des électrolytes sur l'équilibre des substances phosphorées de la cellule bactérienne. [**The Effect of Electrolytes on the Phosphorus Equilibrium of Bacterial Cells**].—*C. R. Soc. Biol. Paris.* **112.** 1009-1011. [2 refs.]

Various bacteria were submitted to 3 washings by centrifuging with either distilled water or 1 per cent. saline solution and the nitrogen and phosphorus contents of the cells were subsequently ascertained. The total nitrogen, acid soluble nitrogen and total phosphorus were the same after each treatment with all the organisms studied, but with certain bacteria (*Bact. coli*, *B. subtilis*, *Pseudomonas pyocyanea* and *Proteus vulgaris*) the acid-soluble phosphorus and orthophosphate phosphorus were not the same after the two treatments. With these organisms, washing with saline increased the amount of acid-soluble phosphorus and phosphate phosphorus by equal amounts, indicating that saline treatment led to a breakdown of non-acid-soluble organic phosphorus compounds of the cell.

—W. R. Wooldridge.

Gutstein, M. (1932). Farbstoffspeicherung durch lebende Bakterien. [**Pigment-Storage by Living Bacteria**].—*Zlb. Bakt. I. (Ref.).* **105.** 478-480.

The author has found in his researches that yeast organisms can absorb both acid and basic dyes. Both fat-soluble and non-fat-soluble dyes can be taken up by living bacterial cells. The basic dyes pyronin and fuchsin are reduced in bacteria ; alkaline medium favours the absorption of basic dyes and acid medium the absorption of acid dyes.

This information led the author to try and discover the pH in live bacterial cells and to this end the colour reactions of 12 indicators added to living cultures were studied. The results showed that cultures of staphylococci and streptococci grow at a pH of 6·8 to 6·4 ; the pH of *Bact. coli* and Friedlander's bacillus is far more alkaline (7·2 to 7·6). The latter applies also to the paratyphoid group, the dysentery group and the brucella group.

The theory of pigment assimilation by living bacteria is discussed and the author observes that it is due to a type of phagocytosis.

—W. von Düring (Berlin).

DISEASES CAUSED BY PROTOZOAN PARASITES.

REES, C. W. (1933). **The Experimental Transmission of Anaplasmosis by** *Dermacentor andersoni.—Parasitology.* **24.** 569-573. [6 refs.]

Rees shows that anaplasmosis can be experimentally transmitted by *D. andersoni* under the following conditions :—(1) larvae may acquire infection from bovines and transmit it in the nymph stage to bovines and (2) nymphs may acquire infection from bovines and in the adult stage transmit it to bovines. Hereditary transmission was not demonstrated. These larvae and nymphs are commonly found in corrals where cattle are kept and in view of their ability to engorge on cattle it must not be too readily re-affirmed that they require rodent hosts in nature. There are localities where *D. andersoni* does not occur, although rodents and large animals are found, and the factor which limits its distribution is yet to be discovered. Stress is laid on the economic importance arising from the incrimination of *D. andersoni* and *D. variabilis* as vectors of anaplasmosis and the possibility of tick-borne anaplasmosis occurring anywhere within the known range of distribution of that disease in the United States, so far as a coincident distribution of known tick carriers can establish this possibility.

—EDWARD F. PECK.

DIKMANS, G. (1933). **Anaplasmosis. I. Its Occurrence in Louisiana. II. A Short Review and a Preliminary Demonstration of Its Identity in Louisiana. III. A Further Experimental Demonstration of Its Identity in Louisiana, IV. The Carrier Problem.**—*J. Amer. Vet. Med. Ass.* **82.** 739-740, 741-748. 855-861 and 862-870. 1 fig., 1 table. [30 refs.]

In this paper the author records the occurrence of anaplasmosis in 5 " tick-free " localities in Louisiana, together with an outbreak in a district still within the tick-quarantine area.

The author first of all reviews the publications of THEILER and others on the subject of anaplasmosis and its transmission by species of the tick *Margaropus* [*Boophilus*]. He then outlines the history of the disease in the United States and observes that, although the coccus-like bodies were first recognized by SMITH and KILBORNE in 1893, they were not associated with a distinct disease, but were thought to occur in mild forms of Texas fever. Since 1924, cases of anaplasmosis unassociated with piroplasmosis have been reported and, with one exception, such cases have occurred in officially declared tick-free areas. These reports have been received with scepticism and doubts have been expressed as to their true nature. Suggestions have been advanced that the disease occurred only in heavily-fed, mature dairy cattle and that it could not be transmitted by blood inoculation ; others have claimed that it is haemorrhagic septicaemia. Following a discussion of these points, the author gives an account of his preliminary experiments disproving each of these views.

As the diagnosis of the disease was based on clinical observations rather than on experimental evidence, the author gives an account of his experimental investigations which confirmed the view that the disease was anaplasmosis.

The occurrence of anaplasmosis in tick-free areas raised the question of the nature of the carrier or transmitter of anaplasmosis. The author first of all planned experiments to determine whether *Margaropus* [*Boophilus*] *annulatus* could convey the disease to susceptible animals, as he states that it has never been proved experimentally that this tick is a carrier of anaplasmosis unaccompanied by piroplasmosis. His experiments resulted in one bovine becoming infected, one doubtful reaction and two negative results, one of which proved to be in an immune animal. Infesta-

tion experiments with *Amblyomma americanum* failed to convey anaplasmosis to susceptible cattle.—GWILYM O. DAVIES.

ROBINSON, E. M., & COLES, J. D. W. A. (1932). **A Note on** *Aegyptianella pullorum* **in the Fowl in South Africa.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 31-34. 4 figs. on 2 plates. [3 refs.]

This note records the detection of *Aegyptianella pullorum* in 4 fowls in South Africa. It was doubtful how far the parasite was responsible for disease in the birds in question, but the authors consider that it may be the cause of a chronic fatal anaemia which is not uncommon in fowls in South Africa.

—U. F. RICHARDSON.

I. O'ROKE, E. C. (1932). **The Control of** *Leucocytozoon anatis* **Wickware.**—*J. Parasitol.* **19.** 177.

II. MARTIN, R. K. (1932). **The Cytology of** *Leucocytozoon anatis* **Wickware. I. Gametogenesis.**—*Ibid.* 179.

I. The following measures are recommended for the control of *L. anatis*, a protozoan blood parasite, which causes a fatal disease of ducks :—(1) cull out in the spring all ducks found positive on microscopic examination ; (2) hatch ducklings early or late in the year, avoiding the midsummer when there is an abundance of black flies [species not stated] ; (3) continue culling through the summer and do not put fresh ducks into a black fly area within 10 days of the removal of infected ducks ; (4) confine ducklings in a cool dark shed during the warm part of the day when black flies are active ; (5) protect ducklings from the attack of black flies with screenings, 24 meshes to the inch, or with cheese cloth and (6) raise ducklings in areas free from black flies.

Attempted control through the administration of plasmoquine or quinine met with failure, but quinine does retard the development of gametocytes.

II. This paper deals with the formation of gametes ; this was studied in shed blood and in the insect vector. The attenuated form of the organism observed in great abundance in the blood after the 10th day takes no part in gametogenesis. Gametes are formed from rounded gametocytes which are present in the blood on the 9th and 10th days after infection. Following withdrawal of blood, macrogametogenesis is complete within 2 minutes. The microgametes are formed by a regular process of nuclear division and are liberated within 15 seconds following the maturation of the female gametocyte. The zygote develops into the ookinete 4 hours after fertilization. The ookinete is an elongate organism possessing myonemes, vacuoles and a specialized anterior region, and it is capable of forward and lateral movement. The development in the insect vector, *Simulium venustum*, coincides, as regards time, with the development in drawn blood.

—U. F. RICHARDSON.

DUKE, H. L. (1932). **The Polymorphic Trypanosomes of Damba Island, Victoria Nyanza. II. Their Transmissibility by** *G. palpalis.*—*Ann. Trop. Med. & Parasitol.* **26.** 597-601. 2 tables. [5 refs.]

This article records investigations into the transmissibility of the polymorphic trypanosomes of Damba Island over a period of 20 years. Three strains were investigated in 1932. One of these proved more readily transmissible by *Glossina palpalis* than any other strain previously isolated from *Tragelaphus spekei*, the common species of buck on Damba.—U. F. RICHARDSON.

I. BORGHI, B. (1932). Il decorso dell'infezione da Tripanosoma Lewisi nel

ratto giovani e nel ratto adulto. [**The Course of an Infection by** *Trypanosoma lewisi* **in Young and Adult Rats**].—*Boll. Ist. sieroterap. Milan.* **11.** 42-48. 4 charts. [4 refs.]

II. BORGHI, B. (1932). Bestehen bei Trypanosoma Lewisi Unterschiede zwischen den Formen aus dem Blute und solchen aus dem Ueberträger? [**Are there Differences between the Forms of** *Trypanosoma lewisi* **from the Blood and those from the Invertebrate Host?**]—*Zschr. Hyg. u. Infektkr.* **113.** 490-492. [4 refs.]

I. This paper records the differences between the course of a *T. lewisi* infection in young and old rats infected by the oral administration of a suspension of infected fleas. In the adult rats, the number of trypanosomes in the peripheral blood remained practically constant throughout the infection, which lasted from 65 to 78 days and terminated in a crisis. In the young rats the course of infection was marked by remissions and recrudescences; the duration was from 85 to 95 days and recovery was by lysis. Three out of 7 rats, infected when only 4 days old, died.

II. This paper records that it is easy to infect rats by dropping a suspension of infected dog fleas on to the oral mucous membrane, whilst, if diluted blood containing the ordinary blood form of *T. lewisi* is dropped on to the oral mucous membrane, no infection occurs unless the membrane has been injured. MANTEUFEL has shown that the blood form of *T. lewisi* can penetrate uninjured skin. When immune serum was mixed with either infected blood or a suspension of an infected flea and inoculated into susceptible rats, no infection occurred with either form of the trypanosome.—U. F. RICHARDSON.

KOFOID, C., & DONAT, Fae. (1933). **The experimental transfer of** *Trypanosoma cruzi* **from naturally infected** *Triatoma protracta* **to mammals in California.** —*Bull. Soc. Path. exot.* **26.** 257-259. [8 refs.] [Orig. in English].

This article records the infection of the Virginian opossum and the dusky-footed wood rat with a trypanosome of the digestive tract of *Triatoma protracta*, the cone-nose bug of California. Infection was effected by intraperitoneal injection of a suspension of gut contents, feeding with infected bugs and injecting diluted bug faeces under the eyelid. It was possible to transfer the trypanosome from mammal to mammal by intraperitoneal inoculation of citrated blood. If no trypanosomes appeared in 3 to 4 weeks the animals were splenectomized and in many cases trypanosomes then appeared in the peripheral blood.

The trypanosome is identified as *T. cruzi* owing to its similar morphology, rarity in the peripheral blood, its invasion of tissues and the fact that development occurs in the tissues in large cyst-like groups of leishmaniform organisms. The development stages in *Triatoma protracta* are similar to those of *T. cruzi* in *Triatoma megista*.—U. F. RICHARDSON.

GIRAUD, P., & CABASSU, H. (1933). Sur la valeur des procédés de laboratoire pour le diagnostic de la leishmaniose canine naturelle. [**On the Value of Laboratory Tests for the Diagnosis of Natural Canine Leishmaniasis**].—*Ann. Inst. Pasteur.* **50.** 539-549. 1 table.

This article discusses the value, in diagnosis of canine leishmaniasis, of blood examination, the formol-gel test, the urea stibamine test and the examination of preparations from the bone marrow, spleen, liver and skin.

The authors recommend that for routine, clinical diagnosis should be confirmed by the formol-gel test and a search for parasites in skin lesions. They consider the formol-gel test satisfactory if the serum is fresh and filtered formol is used.

Positive readings were obtained in 17 animals in which parasites were found and in 9 treated cases. In 17 apparently healthy animals, 15 negative and 2 positive readings were given.

At autopsy the best place to search for leishmania is the red marrow of the ribs and, following that, the spleen and liver. The liver commonly shows parasites in experimental leishmaniasis, but not in natural cases. Treatment with stibamine rapidly causes the disappearance of parasites from the organs.

—U. F. RICHARDSON.

DISEASES CAUSED BY VIRUSES.

SARNOWIEC, W. (1932). Badania nad wartoscia odpornosciowa przeciwpomorowej krwi odwlóknionej w porównaniu do surowicy u trzody. [**Studies (on Swine) on the Immunizing Value of the Defibrinated Anti-Swine Fever Blood in Comparison with the Serum**].—*Wiadom. wet.* **11.** 297-322. 3 tables. [29 refs.] [Summary in French : abst. from orig.]

Immune defibrinated blood has a weaker but more lasting immunizing effect than antiserum, but must be used in a larger dose (subcutaneously) to be effective.

Defibrinated blood should not be given intravenously owing to the risk of anaphylactic shock. Defibrinated blood also tends to cause local inflammation when injected subcutaneously.—K. SZCZUDLOWSKI (LWÓW).

I. VELU, H., & ZOTTNER, G. (1933). Saponine, extrait testiculaire et diffusion du virus claveleux. [**The Effects of Saponin and of Testicular Extract on the Dissemination of Sheep Pox Virus**].—*C. R. Soc. Biol. Paris.* **113.** 571-572. [4 refs.]

II. BRIDRÉ, J. (1933). Sur la réaction de Durand et Conseil, dans la vaccine et dans la clavelée. [**The Reaction of Durand and Conseil in Vaccinia and Sheep Pox**].—*Ibid.* 577-579. [2 refs.]

I. The limiting effects of a testicular extract and of saponin respectively on the diffusion of sheep pox were tested by adding these substances to a definite dilution of the virus and inoculating the mixtures intradermally into sheep. The testicular extract exerted no apparent influence on the course of the disease, as compared with the controls, i.e., the phenomenon of Duran-Reynals was not observed, but the saponin definitely localized the virus to the point of inoculation and induced a mild type of reaction. All the sheep subsequently resisted a virus of high potency.

II. Batches of sheep immunized (a) against sheep pox, (b) against vaccinia and (c) against both viruses, were tested intradermally with sheep pox and vaccinia antigens respectively, prepared by the method of DURAND and CONSEIL [see this *Bull.* **3.** 306]. The results showed that there was a certain degree of cross-response, i.e. animals immune to sheep pox might react to the vaccinal antigen and *vice versa*. The author suggests that this observation establishes a relationship between the two diseases which may explain the resistance of animals solidly immunized against vaccinia to cutaneous infection with sheep pox virus.

—R. E. GLOVER.

I. FLEISCHHAUER, G. (1932). Zur Durchführung von Impfungen gegen Geflügelpocken-Diphtherie. [**The Technique of Inoculation against Fowl Pox**].—*Deuts. tierärztl. Wschr.* **40.** 766-767. [4 refs.]

II. LEYHAUSEN. (1933). Impfdiphtherie und Pocken beim Geflügel. [**Out-**

break of Fowl Pox following Vaccination].—*Tierärztl. Rdsch.* **39.** 194-196. [2 refs.]

I. Experience has shown that, in inoculating poultry against fowl pox, certain precautions must be observed if difficulties are to be avoided. The author especially mentions the transmission of the virus to healthy animals by means of a contaminated scarifier or needle when inoculations are carried out in infected premises. He considers it essential that the scarifier should be sterilized by means of a spirit-burner following the inoculation of each bird. To avoid a contamination of the vaccine it is dropped from a pipette with a rubber bulb on the scarified skin.

With regard to the details of the technique the original must be consulted.

II. The author points out that vaccination occasionally causes generalization of infection and considerable mortality. He discusses the question of the liability of the veterinary surgeon and of the producer of the vaccine. Very often it is difficult or even impossible to demonstrate a connection between the outbreak of fowl pox and the vaccination ; in some cases, however, it is evident.

In this connection the author reports the following case : out of a flock of 5,500 chicks, 3,700 were inoculated with a vaccine A and 1,800 with a vaccine B. The application of the virus was performed by the feather follicle method. The animals of both groups showed the typical reactions which remained purely localized. Six to eight weeks after the vaccination, the animals of the group inoculated with the vaccine B developed fowl pox. There was considerable mortality and chicks which survived were liable to be stunted in growth. The animals of the group inoculated with vaccine A, however, remained healthy. According to the communication of the producer, the vaccine B was prepared from pigeon pox virus to which a small quantity of live fowl pox virus had been added. After discussing all the circumstances, the author is of the opinion that the addition of fowl pox virus was responsible for the outbreak of the disease. The producer of the vaccine compensated for the losses [not stated whether fowl pox or pigeon pox virus used].—R. Wetzel (Hanover).

I. Brownlee, A., & Wilson, D. R. (1932). **Studies in the Histopathology of Louping-Ill.**—*J. Comp. Path. & Therap.* **45.** 67-92. 10 figs., 2 tables. [8 refs.]

II. Gordon, W. S., Brownlee, A., Wilson, D. R., & MacLeod, J. (1932). **Studies in Louping-Ill (An Encephalomyelitis of Sheep).**—*Ibid.* 106-140. 3 tables, 7 charts. [11 refs.]

III. MacLeod, J. (1932). **Preliminary Studies in the Tick Transmission of Louping-Ill. (I) Review and Analysis of Previous Transmission Experiments. (II) A Study of the Reaction of Sheep to Tick Infestation.**—*Vet. J.* **88.** 276-284. 1 chart. [8 refs.]

I. The authors have made a histo-pathological study of the lesions of the central nervous system in " louping ill." Their material was taken from seven natural and five experimental cases in sheep, four experimental pigs and from experimental mice. The existence of " louping ill " in the naturally infected sheep was confirmed by experimental inoculation of susceptible animals. In all the sheep, whether naturally or experimentally infected, the lesions were those of meningo-encephalo-myelitis. There was present a varying degree of destruction of the Purkinje cells of the cerebellum and frequently severe damage to nerve cells was observed in all parts of the medulla and spinal cord. Specific inclusion bodies were not demonstrated. Haemorrhages into nerve tissues were rarely observed and were not considered a feature of the lesions. In the pig, there was present very intense cellular infiltration, but little nerve-cell destruction. In the

mouse, necrosis of most of the large nerve cells of the medulla and spinal cord was the main feature.

II. The authors review the literature on " louping ill " published since 1930 when POOL and his co-workers demonstrated for the first time the transmissibility of the disease from sheep to sheep. They conclude that it may now be accepted that the cause is a neurotropic filter-passing virus, which sets up a meningo-encephalo-myelitis, that blood drawn during the initial febrile reaction in sheep contains the virus, that the mouse is susceptible to intracerebral inoculation and is a suitable test animal for the detection of virus, that a virus reaction in sheep confers immunity to subsequent inoculation and that virus in the form of dried and powdered sheep brain may be preserved alive for long periods. It has further been shown that a tick-borne fever, immunologically distinct from " louping ill," results in normal sheep from the bites of ticks from " louping ill " pastures.

The authors in further experimental work have shown that the febrile period of " louping ill " corresponds to the period when virus is detectable in the blood, that the febrile reaction may terminate in death without the onset of typical symptoms and that the invasion of the central nervous system by the virus produces clinical " louping ill." The use of living virus as a prophylactic is dangerous.

III. The author carried out controlled experiments in tick infestation in sheep. Temperature records were kept of sheep infested with ticks collected from " louping ill " farms, sheep infested with ticks from a clean source, and uninfested sheep kept upon the same experimental land. Conclusions were drawn that infected ticks may cause a temperature reaction in healthy sheep due to the transmission of an infective agent and not merely as a result of their bites. The infective agent was transmitted by blood inoculation from sheep to sheep and blood was found to be infective when drawn 44 days after the febrile reaction had disappeared. This tick-borne infection is a pathological entity immunologically distinct from " louping ill."

The author believes that it was this tick-borne fever which STOCKMAN transmitted in his experiments of 15 years ago, and not true " louping ill."

—S. H. GAIGER.

I. GORDON, W. S., BROWNLEE, A., WILSON, D. R., & MACLEOD, J. (1932). **" Tick-borne Fever " (A hitherto Undescribed Disease of Sheep).**—*J. Comp. Path. & Therap.* **45.** 301-312. 4 charts. [5 refs.]

II. MACLEOD, J., & GORDON, W. S. (1933). **Studies in Tick-Borne Fever of Sheep. I. Transmission by the Tick,** *Ixodes ricinus*, **with a Description of the Disease Produced.**—*Parasitology.* **25.** 273-283. 4 charts. [6 refs.]

I. MacLeod showed that ticks (*Ixodes ricinus*) from " louping ill " farms may set up a febrile disease in sheep, recovered animals being non-immune to " louping ill." Gordon and his co-workers found that " louping ill " immune sheep, exposed upon " louping ill " farms to the bites of ticks, developed a febrile disease. To this febrile disease the name " tick-borne fever " has now been given. This condition is now subjected to a more careful study by the authors. The incubation period is from 4 to 8 days, the febrile period lasting about 10 days. After a period of dullness and loss of weight, the great majority recover. Killed affected animals show splenic enlargement. The infection can be transmitted by passage from sheep to sheep, but neither mice nor any species of animals other than sheep have so far been infected. The infective agent is present in the blood during fever and for long periods thereafter. It has also been demonstrated in the mesenteric glands, spleen and central nervous system. The nature of the infective agent is not as yet apparent, but possibly it belongs to the genus *Rickettsia*.

Immunological experiments have shown tick-borne fever and " louping ill " to be distinct diseases.

II. The authors have found that the nymph and female *Ixodes ricinus* transmit infection, but the larva was not found to be infective. The goat was shown to be susceptible to subcutaneous inoculation with blood and to tick infestation.

—S. H. GAIGER.

HINZ, W. (1932). Kasuistischer Beitrag zur Frage der Staupeprophylaxe beim Hunde durch die Staupevakzine nach Laidlaw-Dunkin. [**Clinical Contribution to the Question of Prophylaxis of Canine Distemper by the Laidlaw-Dunkin Vaccine**].—*Tierärztl. Rdsch.* **38.** 797-799.

The author describes the results obtained with six groups of young dogs treated since 1931 with the Laidlaw-Dunkin vaccine-virus method (part with fluid virus and part with dried virus, but none with the most recent simultaneous method).

The case history of each group is given and, according to the author's interpretations, the results were favourable, though it was noticed that control dogs given virus alone did not sicken appreciably more than the rest, indicating that the virus was of low virulence.

Unfortunately, further trials of this method on a large scale in Germany are hindered by financial obstacles.—J. E.

PICARD, W. K. (1933). Pseudovogelpest IV. Immunisatie tegen pseudovogelpest volgens de methode van Bergeon en Gébe. [**Newcastle Disease. IV. Immunization by Bergeon's and Gébe's Method**].—*Ned.-Indisch. Blad. Diergeneesk.* **45.** 62-79. 2 tables. [37 refs.] [Summaries in English and German : abst. from orig.]

Further to his former publications on immunization against Newcastle disease, the author reports on his latest experiments regarding the application of an organ-vaccine, on the lines of BERGEON and GÉBE'S vaccine against rinderpest in Indo-China.

The vaccine was prepared from the virulent brain, liver, spleen, testes and egg-yolk of chickens artificially infected with passage virus and killed when dying from Newcastle disease. The organ-material was ground in a mill and exposed to the influence of a concentrated salt solution (9 per cent.) in order to loosen the virus completely from the cell-structure through osmosis. It is interesting to mention here that recent researches showed the blood and organs of chickens infected with passage-virus to be highly virulent, which in accordance with the other qualities of the virus indicates the gradual elimination of the hitherto existing differences between fowl plague and Newcastle disease. It may be emphasized that these indications only date from recent experience, after years of experimenting with the virus of Newcastle disease.

A number of susceptible chickens were inoculated with the newly made organ-vaccine, but the results were not successful. Owing to the inoculation, a certain number of fowls died from Newcastle disease, whereas the remaining birds showed a total lack of immunity against subsequent infection with 100 M.L.D. of passage-virus as well as against natural infection.

—B. J. C. TE HENNEPE (ROTTERDAM).

INVERTEBRATE VECTORS OF DISEASE.

KELSER, R. A. (1933). **Mosquitoes as Vectors of the Virus of Equine Encephalomyelitis.**—*J. Amer. Vet. Med. Ass.* **82.** 767-771.

In a preliminary report to the Washington Branch of the Society of American Bacteriologists in March, 1933, the author stated that the mosquito *Aëdes aegypti* was able to transmit the virus of equine encephalomyelitis to guinea pigs. A similar mosquito-feeding experiment with a horse was in progress at the time, but no results had been obtained.

The object of this communication is to state that it has now been definitely shown that mosquitoes can also transmit infection to horses. A brief summary of the experiments is given pending a detailed account which will be published later.—GWILYM O. DAVIES.

KERR, J. A., & HAYNE, T. B. (1932). **On the Transfer of Yellow Fever Virus from Female to Male Aëdes aegypti.**—*Amer. J. Trop. Med.* **12.** 255-261. [3 refs.]

ARAGAO concluded that male *Aëdes aegypti* could be infected with yellow fever virus by placing them in contact with infected females of the same species. Working with monkeys, mosquitoes and the Asibi strain of virus, the authors have been unable to effect mosquito to mosquito passage in this manner, although copulation occurred and they therefore conclude that such a method of transmission is unimportant.—NORMAN HOLE.

KRIJGSMAN, B. J., & PONTO, S. A. S. (1932). De teken van den oost-indischen Archipel. [**The Ticks of the East Indian Archipelago**].—*Veeartsenijk. Med. Dept. Landbouw, Buitenzorg.* No. 79. pp. 62. 48 figs., 5 maps. [32 refs.]

The knowledge of the geographical distribution of the ticks in the East Indies is very important in connection with the transmission and spread of piroplasmosis. This fact is not sufficiently known. Krijgsman and Ponto surveyed the results of their experiments and indicated the districts where the ticks have been found. They added to their work an identification key of the ticks found in the East Indies. The work contains many good illustrations of the different ticks and this makes it easier to distinguish the species.

The following ticks have been found in the East Indian Archipelago, either by the authors or by others :—

Argas persicus, *A. vespertilionis.*
Boophilus annulatus.
Rhipicephalus sanguineus, *R. haemaphysaloides.*
Haemaphysalis papuana, *H. bispinosa*, *H. cornigera*, *H. hystrieis*, *H. wellingtoni*, *H. leachi*, *H. toxopei*, *H. novae-guineae* n. sp., *H. mono-spinosa* n. sp.
Amblyomma testudinarium, *A. cyprium*, *A. sublaeve*, *A. helvolum*, *A. caelaturum*, *A. cordiferum*, *A. geoemydae*, *A. robinsoni*, *A. dammermani*, *A. papuana.*
Hyalomma aegyptium.
Aponomma gervaisi, *A. trimaculatum.*
Dermacentor auratus.
Ixodes holocyclus, *I. cordifer*, *I. spinicoxalis*, *I. granulatus.*

—A. KLARENBEEK (UTRECHT).

DISEASES CAUSED BY METAZOAN PARASITES.

BLACKLOCK, D. B. (1932). **Parasitology in the Medical Curriculum.**—*Brit. Med. J.* June 18th. 1138-1139. [Reported verbatim in *Vet. Rec.* **12.** 899-901].

The author makes a plea for the teaching of elementary parasitology as a

constituent part of the subject of zoology early in the medical student's curriculum. He regards parasitology as a very important subject and thinks its early introduction would stimulate the student's interest. Utility is regarded as the chief and almost the sole criterion of the value of education and he considers that parasitology should be taught, not with the idea of imparting as much knowledge of the subject as possible, but as much as will prove of practical value to the student.

—E. L. TAYLOR.

I. TILLYARD, R. J., & SEDDON, H. R. (1933). **The Sheep Blowfly Problem in Australia. Report No. 1.**—*Council Sci. & Indust. Res. Pamphlet.* No. 37. pp. 136. 15 figs., 6 plates, 7 tables. [127 refs.]

II. -. (1933). **The Blowfly Problem.—Forthcoming Comprehensive Report.** —*J. Sci. & Indust. Res. Australia.* **6.** 62.

III. LEREW, W. M. (1932). **The Sheep Industry. Helpful Hints to Sheep-Men. 5. The Sheep Blowfly.**—*J. Dept. Agric. Victoria.* **30.** 515-523. 9 figs.

I. This report was prepared by the Joint Blowfly Committee and is edited by Tillyard and Seddon. Fundamental details are given about the morphology and biology of the flies and maggots. The report also deals with the description, origin and spread of fly strike and gives an account of past and present investigations on blowflies. The factors influencing fly abundance and the susceptibility of certain sheep are discussed, as also are the various measures for combating strike. Among the latter is mentioned a fold-removing operation performed with Burdizzo pincers, the fold of skin being cut off with a knife inside the jaws of the pincers. The wrinkles on the hind legs are removed from an inch above the vulva to a spot between the hind legs ; the operation is advised when the sheep are 3 weeks old or earlier if the crutches are very moist. The spread of fly strike is believed to have followed the improvement of fleeces by Merino crosses. A coloured plate illustrates the adults of the different species of blowflies and there are 5 pages of references. The original should be consulted by those interested.

II. Reference is made to the report of the Joint Blowfly Committee [see I above].

III. Lerew discusses the subject in a general manner, giving concise information on the biology and habits of the sheep blowflies and the methods of control, including destruction and poisoning of carcasses and maggot and fly traps. In considering preventive and curative treatment, crutching, dipping, jetting and swabbing are discussed and details given of each. Prescriptions are given of 2 dressings suitable for the destruction of the maggots in fly-blown sheep.

—J. S. STEWARD.

MITCHELL, W. C., & COBBETT, N. G. (1933). **Notes on the Life Cycle of** *Oestrus ovis*.—*J. Amer. Vet. Med. Ass.* **82.** 780-781. [3 refs.]

In the course of investigations concerning the treatment and control of *Oestrus ovis* infestation of lambs in Texas and New Mexico, the following data relative to the life cycle of the parasite were determined :—

(1) The larvae of *Oestrus ovis* develop to maturity in $2\frac{1}{2}$ to $3\frac{1}{2}$ months in the heads of spring lambs.

(2) Mature larvae pupate at ordinary room temperature in 12 to 72 hours and flies emerge from these pupae in 17 to 37 days. Flies kept in captivity live for 4 to 32 days.

(3) The life cycle of *Oestrus ovis* may be completed in $3\frac{1}{2}$ to $4\frac{1}{2}$ months.

—GWILYM O. DAVIES.

PRO, G. (1932). Zoppina vomitoria : Nuova affezione contagiosa della specie ovina e caprina. [**Zoppina vomitoria : A New Contagious Disease of Sheep and Goats**].—*Mod. Zooiat.* **21.** 545-547.

A contagious disease affecting sheep and goats, consisting of an inflammation and suppuration of the coronet and the sole of the foot.

The disease is caused by the presence of a tick (*Rhipicephalus sanguineus*) on the coronet. The lesions produced by the tick attract flies (*Musca vomitoria*) which lay eggs, and the larvae complicate the local lesions. The full process is summarized as follows :—

FIRST STAGE OF THE DISEASE :—an acute swelling of the coronet and the sole of the hoof accompanied by lameness and fever.

SECOND STAGE :—eruption and ulceration of the claw and coronet setting up a septic inflammation of the neighbouring ligaments and joints ; duration 15 to 20 days.

THIRD STAGE :—necrosis of the tissues of the sole, suppuration, loss of condition, marasmus and sometimes death.

TREATMENT :—destruction of the ectoparasites, disinfection by copper sulphate solution and permanganate solution 8 per cent.—F. VEGLIA (TURIN).

I. ORTLEPP, R. J. (1932). **Some Helminths from South African Chiroptera.** —*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 183-196. 17 figs. [12 refs.]

II. CAMERON, T. W. M. (1933). **The Internal Parasites of Pigs : A Survey.** —*Vet. J.* **89.** 70-74.

III. ACHARYA, S. K. (1933). **Incidence of Helminth Parasites in Pariah Dogs.** —*Ind. Vet. J.* **9.** 210.

I. Descriptions are given of 5 species of nematodes, 4 of them being new to science. They were collected from 2 species of South African bats, and are as follows :—*Anoplostrongylus alatus* and *A. ornatus* (Mönnig, 1927) Baylis, 1930, from the intestine and *Litomosa chiropterorum* from the abdominal cavity of *Miniopterus natalensis* ; *Strongylacantha pretoriensis* from the intestine of *Rhinolophus zuluensis* and *Physaloptera bedfordi* from the stomach of the same species.

II. Mention is made of the principal protozoan and metazoan parasites of the pig, along with a few notes on their occurrence, life histories and methods of control.

III. In the examination of 50 pariah dogs in Lucknow 49 were found to be infected with *Ancylostoma caninum*, 11 with *Dipylidium caninum*, 8 with *Taenia serrata*, 7 with *T. marginata*, one with *T. coenurus*, 3 with *Toxocara canis* and 7 with *Spirocerca sanguinolenta*.—E. L. TAYLOR.

I. SINITSIN, D. F. (1932). **Complementary Note to my Observations on the Life History of** *Moniezia expansa*.—*J. Parasitol.* **19.** 163.

II. WARDLE, R. A. (1933). **Significant Factors in the Plerocercoid Environment of** *Diphyllobothrium latum* **(Linn.).**—*J. Helminthol.* **11.** 25-44. 4 figs. [20 refs.]

I. This author, who had previously reported extraordinary observations on the eggs of *Moniezia expansa* [see this *Bull.* **1.** 302.] here records the observation that the intestines of infested sheep usually contain large numbers of empty egg-shells of this species and that in many of these a small pore encircled with a thick ring may be found. From this, he argues that the mature embryo is unable to withstand the digestive ferments of the host's intestine.

II. Observations on all the factors which might influence the development

of parasitic helminths are an important preliminary step towards their ultimate cultivation *in vitro*. Wardle here reports on a series of observations on the influence of temperature, hydrochloric acid and various salts upon the plerocercoids of *D. latum*. In sodium chloride of a molecular concentration of 0·2, temperatures between −8° and 55°C. are tolerated ; at 0°C. the survival time was found to be more than 24 hours, but below −8°C. death occurred almost instantaneously. Molecular concentrations of hydrochloric acid varying between 0·3 and 0·001 are tolerated and sodium carbonate between 0·2 and 0·001. Some interesting notes are also given on the prevalence of *D. latum* in fish in Manitoba.—E. L. TAYLOR.

I. KELLAWAY, C. H., & FAIRLEY, K. D. (1932). **The Clinical Significance of Laboratory Tests in the Diagnosis of Hydatid Disease.**—*Med. J. Australia*. March 5th. 340-342. 3 figs.

II. BRESSOT, E. (1932). L'aide du laboratoire dans le diagnostic des kystes hydatiques. [**Laboratory Aids in the Diagnosis of Hydatid Disease**].—*Presse méd.* **40.** 478-479. [2 refs.]

I. A concise account is given of the use of the intradermal and complement-fixation tests and of the examination of material from suspected cases of hydatid disease. The immediate reaction to the intradermal test is regarded as only of value prior to the first operation for the removal of the cysts and, when a delayed reaction is observed, it is considered necessary to exclude sensitization to host protein, infestation by other helminths and local sensitization resulting from a previous injection of hydatid antigen.

The complement-fixation test, by the technique advocated by N. H. FAIRLEY, is apparently thought to be more reliable ; the fixation of 4½ doses of complement is considered diagnostic prior to operation and the fixation of 6 doses as diagnostic 9 months after operation.

II. The diagnosis of hydatid disease requires the combination of clinical, radiological and biological examinations. It is only in very rare cases that clinical examination will suffice for a definite diagnosis ; intradermal reactions have proved particularly helpful and radiological examination is almost indispensable to the surgeon. The article is written in response to criticism of laboratory aids to the diagnosis of this disease.—E. L. TAYLOR.

MEHL, S. (1932). Die Lebensbedingungen der Leberegelschnecke (*Galba truncatula* Müller). [**The Bionomics of the Liver Fluke Snail** *Limnaea truncatula*].—*Bayer. Landesanstalt f. Pflanzenbau u. Pflanzenschutz*. No. 10. pp. 177. 23 figs. on 9 plates, 1 map. [183 refs.]

This treatise is in the form of a monograph on the association of *Limnaea truncatula* with fascioliasis. The systematic position of the snail and its morphology —apart from that of the shell—are not discussed, but the various aspects of its association with liver rot in farm animals are fully dealt with. Its distribution in the various kinds of grounds and various kinds of ditches, streams and ponds was carefully studied in certain districts. The life history, reproduction, feeding habits, resistance to cold and drought, means of transportation, natural enemies, the control measures which may be used against it and the possibility of other species acting as intermediate hosts are also fully dealt with. The author was able to find *L. truncatula* wherever fascioliasis occurred and he thinks it improbable that any other species can effectively carry infection in Western Europe. Although dressing the land with copper sulphate is very effective in controlling the snail, eradication is considered to be impracticable. Attention is, however, called to wrong statements which have crept into the literature as to the effectiveness of

this means of control ; a 1 : 1,000,000 solution or even a 1 : 1,000 solution is not sufficiently strong to apply to the ground ; the copper sulphate must be in a concentration of at least 1 or 2 per cent. to be of any value. One part of copper sulphate added to 250,000 of water in clear ponds without much vegetation is sufficient, but in muddy ponds and ditches the concentration needs to be as high as one part of copper sulphate to every 500 of water.

Considering that carbon tetrachloride is regarded in many parts of Germany as too dangerous a drug to use, it is interesting to note that Mehl recommends it, without specifying any precaution for the treatment of wandering flocks, and does not mention any alternative treatment. The numerous photographs of *L. truncatula* illustrate its wide range of variation and a map shows the distribution of the disease in Bavaria ; the key to the meaning of the various signs used thereon appears, however, to have been omitted.

A good knowledge of the bionomics of intermediate hosts is an important branch of economic parasitology and this book is a very useful addition to the parasitologist's library.—E. L. TAYLOR.

MALKANI, P. G. (1933). **Discovery of the Cause of Nasal Granuloma. Preliminary Report.**—*Ind. Vet. J.* **9.** 194 and 257-277. 18 figs. on 5 plates. [30 refs.]

The first paper is an abstract of an article read before the 20th Session of the Indian Science Congress, Patna, 1933, the subject matter of which is the same as that given in the second paper.

In the second paper the author observes that nasal granuloma in cattle, a condition which so far has been recorded only in India where it is colloquially called " sunsuna," has been recognized for a great many years and has been regarded as a streptothricosis closely related to actinomycosis.

The author first of all reviews the history of the condition and then records the details of his work showing that the actinomycotic theory of its causation is no longer tenable and that nasal granuloma is a form of schistosomiasis, the responsible species being either *Schistosoma spindalis* Montgomery, 1906, or a very closely related species. The parasite is to be seen in sections of the granuloma and characteristic spindle-shaped eggs are present in smears of nasal discharge from all affected animals. Furthermore the schistosome theory affords the most satisfactory explanation of the regional and seasonal occurrence of the disease, its distribution being confined to those localities and seasons which favour the intermediate host, the snail. The successful treatment of the condition by tartar emetic is also in keeping with the specific action of this drug in human schistosomiasis. It has both curative and prophylactic properties.

Nasal granuloma also occurs in buffaloes in rare instances and the species of schistosome appears to be identical with the causal agent of the disease in cattle.
—GWILYM O. DAVIES.

I. SSOLONITZIN, J. A. (1933). Erkrankungen der Milz, hervorgerufen bei Pferden durch Habronema megastoma. [**Disease of the Spleen of the Horse caused by** *Habronema megastoma*].—*Berl. tierärztl. Wschr.* **49.** 213.

II. DATTA, S. C. A. (1933). **Histopathological Studies on a Case of Helminthic Granuloma of the Equine Skin.**—*Ind. Vet. J.* **9.** 195-196.

I. Ssolonitzin reports on 2 specimens of diseased horse spleen in the museum of the Veterinary Institute of Kasan. These show nodules of a cartilaginous consistency, composed of tough fibrous tissue, 3 to 5 cm. diameter in the one instance and 1 to 2 cm. diameter in the other. Section revealed the presence

of a comparatively large number of worms which proved to belong to the species *H. megastoma*, and to be sexually mature, some of the females containing eggs. He compares the nodules with those found in the stomach and those which have been described by French authors as being caused by the larvae of this species in the lung. Apparently these worms wander in the body more than had been appreciated.

II. Sections of a bursatti sore revealed the presence of nematode larvae believed to be *Habronema*.—E. L. TAYLOR.

I. GRAY, H. (1933). *Dioctophyme renale* **(Goeze, 1782) in the Kidney of a Dog.**—*Vet. Rec.* **13.** 276-278.

II. TAYLOR, E. L. (1933). **The Longevity of Parasitic Worms with Special Reference to a Report of the Occurrence of Dioctophyme Renale in this Country.**—*Ibid.* 407. 1 table. [1 ref.]

I. A specimen of this large and rather rare species of nematode was found in one of the kidneys at *post-mortem* examination of a dog which had died after about 16 days illness. The dog had been brought to this country from India two years previously. A report by HARE on the pathology of the infected kidney is appended.

II. Taylor points out that there is nothing extraordinary in this evidence that a parasitic worm has lived for 2 years and gives a list of 19 reports of long life in nematodes, trematodes and cestodes in which longevity ranging from 2¼ to 30 years is recorded.—E. L. TAYLOR.

I. SOLOMON, S. G. (1933). **Faunistic Note on a Collection of Helminthic Material from Palestine.**—*J. Helminthol.* **11.** 1-8. [7 refs.]

II. LI, H. C. (1933). **Report on a Collection of Parasitic Nematodes, Mainly from North China. Part 1. Filarioidea.**—*Parasitology.* **25.** 192-223. 53 figs. [56 refs.]

III. DAUBNEY, R. (1933). **Trichostrongylid Nematodes from Sheep in Kenya.** —*Ibid.* 224-241. 17 figs. [9 refs.]

I. The 117 bottles of material which make up this collection of worms from domestic and farm animals contained 12 species of cestodes, 12 species of nematodes and one species of trematode. Most of the species are those commonly met with in this country, but the following might be mentioned as of special interest :—*Cysticercus cellulosae* was found 4 times, *Avitellina centripunctata* and *Helictometra giardi* each 3 times, *Subulura brumpti* once and *Onchocerca armillata* once. This last is the most interesting find in the whole collection ; fragments of worms belonging to the species were extracted from the hard spherical fibrous nodule in the aorta of a bull. A note is given on the pathological condition of the portion of aorta, confirming the observation made by LINGARD in 1905.

II. Five new species are here described under the names *Diplotriaena microphallos*, *D. cantonensis*, *Onchocerca bambusicola*, *Pseudaprocta decorata* and *Chandlerella sinensis*. *D. microphallos* was found in the mesentry of a domestic duck, but the other 4 new species are not of direct veterinary interest. The genus *Diplotriaena* is discussed at length and 9 species of filaroid worms, other than those mentioned above, are also described.

III. Many species of nematodes are able to thrive successfully in the most arid environment and the most serious loss to sheep owners in Kenya is caused by heavy infestations with these worms. The sheep rearing areas may be divided into high plateau land with a high annual rainfall, where the Romney Marsh breed is extensively kept, and lower plains country with a relatively low rainfall,

where the sheep are almost entirely of Merino stock. The hookworm, the twisted wireworm, the nodular worm and various species of *Trichostrongylus* are common to both localities, but *Ostertagia* spp. are quite definitely restricted to the upland area. *Cooperia* and a related genus *Cooperioides* (described in this paper for the first time) and *Impalaia* are found in sheep in the plains area. The last mentioned genera are normally present in wild game and it is considered that during the last 6 years there has been a marked tendency for several species of nematodes of wild game to establish themselves permanently in sheep.

Three new species are described, *Trichostrongylus hamatus*, *Cooperioides kenyensis* and *Ostertagia primata*, all from sheep. A description and notes on occurrence and pathogenicity of several other species are also given.

—E. L. Taylor.

IMMUNITY.

Ramon, G., & Lemétayer, E. (1933). Immunité antitétanique naturellement acquise chez les animaux des espèces bovine, ovine et caprine. **[Naturally Acquired Antitetanic Immunity in Animals of the Bovine, Ovine and Caprine Species].**—*C. R. Soc. Biol. Paris.* **112.** 1157-1160. [15 refs.]

The authors record that they have been able to demonstrate the presence of appreciable quantities of tetanus antitoxin in the sera of cattle, sheep and goats, which have never had tetanus or been submitted to antitetanic vaccination. The quantity of antitoxin present appears to increase with age.

In attempting to explain this natural production of antitoxin in ruminants, the authors refer to the fact that most investigators have failed to demonstrate its presence in man and horses. The explanation appears to be that the production of toxin is rendered impossible by the digestive juices. In ruminants, on the other hand, it is suggested that the size and arrangement of the stomach enable multiplication and toxin production to go on in the first 3 chambers, and this toxin, perhaps modified by the gastric juice, is absorbed from the 4th stomach into the system where it stimulates the production of antitoxin.

—Gwilym O. Davies.

I. Opie, E. L. (1932). **The Cellular Reactions of Tuberculosis and the Relations to Immunity and Sensitization.**—*Amer. J. Path.* **8.** 623-624.

II. Woodruff, C. E. (1932). **Changes which Occur in the Tubercle Bacillus in Relation to the Developing Tubercle.**—*Ibid.* 635-636. [Papers presented to 32nd Ann. Meet. of the Amer. Ass. of Pathologists and Bacteriologists, Philadelphia, Pennsylvania, April 28th and 29th, 1932].

I. This reference is a very brief statement of the items which were discussed and details are not given. Mention is made of the difference of opinion concerning the significance of such terms as inflammatory reactions, exudation, symptoms of sensitization, immunity and allergy as applied to tuberculosis. The term abscess should not be applied to a tuberculous cavity.

II. This article is a short report of experimental work. Following intraperitoneal inoculation of tubercle bacilli into guinea pigs the bacilli collect largely in the omentum ; 48 hours later the bacilli are found bunched in polymorphonuclear leucocytes or monocytes, but occasionally in the omentum, with no inflammation at the site ; 6 days later the bacilli in omental cells show signs of multiplication, but there is no inflammation at the site ; 10 days later, bacilli are no longer found in omental cells, having been included possibly in newly formed tubercles ; 14 days later, faintly staining acid-fast bacilli are found only in and about tubercles ; 17 days later, the tubercles and tissue surrounding them contain

many long beaded bacilli stained a bright red. [If only several bacilli are deposited at any one site they will be enclosed by tubercle formation before any multiplication takes place owing to the sluggish rate of production ; a point of importance in consideration of the pathogenesis of tuberculous meningitis—see RICH, A. R., & MCCORDOCK, H. A. (1933). *Bull. Johns Hopkins Hospital.* **52.** 5].

—J. R. M. INNES.

I. POPPER, M., TEITEL-BERNARD, A., & DINISCHIOTU, G. T. (1933). Sur l'allergie tuberculinique du sang de Cobaye, mesurée par respirométrie. [**Tuberculin Allergy of the Blood of the Guinea Pig, measured by Respirometry**].—*C. R. Soc. Biol. Paris.* **112.** 1477-1479. 1 chart. [1 ref.]

II. POPPER, M., TEITEL-BERNARD, A., & DINISCHIOTU, G. T. (1933). Allergie tuberculinique du sang humain et respirométrie. [**Tuberculin Allergy of Human Blood and Respirometry**].—*Ibid.* 1479-1481. 1 chart.

I. The quantity of oxygen absorbed per hour by 1 c.c. of blood *in vitro* is practically the same for normal as for tuberculous guinea pigs. While tuberculin does not alter the amount of oxygen utilized by the blood of normal guinea pigs, it causes an increase up to 20 per cent. in the amount utilized by the blood of tuberculous guinea pigs.

II. Tuberculin causes an increase in the amount of oxygen utilized *in vitro* by the blood of persons who react to the tuberculin test, the increase being greater in individuals with active tuberculous lesions. In new-born infants free from tuberculous infection, the oxidation of the blood *in vitro* is not modified by tuberculin.—T. M. DOYLE.

LECOMTE DU NOÜY, P. (1933). Recherches sur le sérum et sa température critique. La conductivité électrique du sérum en fonction de la température. [**Work on Serum and its Critical Temperature. The Electrical Conductivity of the Serum as a Function of the Temperature**].—*Ann. Inst. Pasteur.* **50.** 127-142. 11 figs., 2 tables. [4 refs.]

The power of any solution to conduct electricity depends largely upon the dissociation of the electrolytes and in this paper the author has studied the effects influencing the passage of an alternating current through horse serum. It was found that the conductivity of a serum decreases when, after heating, the temperature falls below 55°C. and increases when the temperature rises above this figure. The resistance to the passage of the current was considered to be due to mechanical phenomena correlated with the hydration of the proteins.

At a temperature below 55°C., there is a fixation of water by the proteins producing an increased concentration of salts and in consequence an increased conductivity. On the other hand, the increase in the value of the non-conducting molecules which occurs on the fixation of the water causes a diminution of the conductivity. The occurrence of both of these phenomena together tends to equalize the conductive properties of the serum. To determine the relative effects of each of these two phenomena, the author has calculated both mathematically and experimentally the increase in concentration of the salts and of the non-conducting molecules.

It was seen that theoretically the increase in conductivity between 55° and 64 C. should be much less than was found experimentally. This discrepancy between the theoretical and experimental determinations may be attributed in part to the effect of temperature ; sufficient data, however, is not available for the exact calculation of the phenomena observed.—A. J. WILSDON.

I. GRATIA, A., & LINZ, R. (1932). Les phénomènes de Sanarelli et de Shwartzman ou l'allergie hémorrhagique. [**The Phenomena of Sanarelli and Shwartzman or Haemorrhagic Allergy**].—*Ann. Inst. Pasteur.* **49.** 131-185. 22 figs., 1 table. [13 refs.]

II. GRATIA, A., & LINZ, R. (1933). L'Allergie hémorrhagique. Relations entre le phénomène de Shwartzman et le phénomène d'Arthus. [**Haemorrhagic Allergy. The Relation of the Phenomenon of Shwartzman to the Phenomenon of Arthus**].—*Ibid.* **50.** 89-105. 2 figs., 1 plate. [11 refs.]

III. BIER, O. G. (1933). Influence de l'extrait testiculaire sur le phénomène de Shwartzman. [**The Influence of Testicular Extract on the Phenomenon of Shwartzman**].—*C. R. Soc. Biol. Paris.* **112.** 407-410. 2 tables. [4 refs.]

I. In this article the authors discuss at considerable length the nature of the phenomena of Sanarelli and Shwartzman and also their relationship to each other.

They conclude that, despite the fact that there are slight differences in the mode of production of the two phenomena, they are essentially identical and are closely related to anaphylaxis, although they do not conform to the classical descriptions of this condition. The authors consider that both the phenomena are forms of allergy and suggest that the reactions should be known as haemorrhagic allergy.

II. The authors consider the relationship between Shwartzman's phenomenon and the phenomenon of Arthus. Their experiments showed that the only difference between the two phenomena is a simple quantitative difference in the intensity and rapidity with which the reactions occur. The Shwartzman is a particularly strong and quickly produced Arthus phenomenon. It appears as if certain microbial products possess a greater tendency than antigens such as horse serum to provoke local anaphylactic reactions.

III. The author notes that DURAN-REYNALS [references are given] demonstrated that an extract of normal testicle intensified the skin lesions produced by certain viruses and species of bacteria. In this paper he summarizes the experiments which he conducted and which proved that a similar extract also intensified and hastened the production of Shwartzman's phenomenon. Thus normal testicle extract appears to be equally capable of influencing skin reactions produced by living organisms and inanimate substances.—GWILYM O. DAVIES.

DIENES, L., & MALLORY, T. B. (1932). **Histological Studies of Hypersensitive Reactions.**—*Amer. J. Path.* **8.** 689-709. 4 figs. on 2 plates, 3 tables. [22 refs.]

It is pointed out in the introduction that there are essential differences between two distinct types of hypersensitiveness, anaphylactic and tuberculin; the points of dissimilarity are given. Histological comparisons were made of the skin lesions in true tuberculin reaction, the tuberculin type produced by egg-white and horse serum, and passive and active anaphylactic reactions. They were able to add to the already recognized differential points as follows :—an initial hyperaemic and exudative phase in the anaphylactic type contrasting with an initial phase of cellular infiltration in the tuberculin type ; a tendency to a predominantly polymorphonuclear leucocytic infiltration in the anaphylactic type comparing with a mononuclear infiltration in the tuberculin type and a tendency to selective epithelial necrosis in the tuberculin type. The importance was stressed of studying relatively mild reactions in order to obtain the sharpest differentiation.

The tuberculin type of hypersensitiveness represents the first stage of the immune response to parenterally introduced protein antigen and it occurs in

uninfected as well as in tuberculous animals. A tuberculous infection quantitatively increases it, but does not alter it qualitatively. It may be demonstrated as early as the 3rd day after sensitization.—J. R. M. INNES.

DIENES, L. (1933). **The Participation of Cutaneous Epithelium in Immunity Response.**—*J. Immunol.* **24.** 253-263. [15 refs.]

It is generally understood that the location of the specific response to antigens is in the connective or reticular tissue. In a number of cases it has been possible to demonstrate antibodies in certain mesenchymal organs before they appear in the circulation and antibody production has also been shown in tissue cultures made from these organs. The study of drug idiosyncrasies, however, has indicated that under appropriate conditions the ectodermal tissue also is capable of a specific immunity response.

A review has been made of the more important works on the artificial production of hypersensitiveness to certain drugs. These observations present good evidence that the epithelium of the skin, when exposed to certain chemical substances, develops active hypersensitiveness. This points to a new principle in the understanding of the immunological response of the organism and, from studies made on tuberculin reactions, the author found that skin reactions of the tuberculin type present many characteristics which point to the direct participation of the cutaneous epithelium in the reaction. The characteristic necrosis in the reaction is in most cases limited to the epithelium and a thin layer of the underlying connective tissue. The epithelium is involved before any macroscopic changes are recognizable. Moreover, the occurrence of necrosis is in no direct connection with the size of the reaction or with the general sensitiveness.—A. J. WILSDON.

DISEASES, GENERAL.

MCFADYEAN, J. (1933). **Equine Melanomatosis.**—*J. Comp. Path. & Therap.* **46.** 186-204. 8 figs. on 1 plate, 1 table. [11 refs.]

The subject is dealt with under 5 heads :—(1) clinical ; (2) morbid anatomy and histology ; (3) source of melanin in the normal body ; (4) nature of the pigment-producing cells in melanotic neoplasms and (5) aetiology.

Under the first head it is pointed out that about 80 per cent. of grey horses of either sex develop one or more melanomas if they reach old age. Another remarkable fact in connection with the disease is that it is very rare in animals under adult age.

It is suggested that the special predisposition of grey horses may have originated as a mutation. The evidence regarding the nature of the melanoblasts is, in the author's opinion, inconclusive, but the balance appears to be in favour of the view that they are derived from the mesenchyme and not from epithelium. A fact strongly against the latter view is that tumours arising in connection with the epithelium of the skin—the epitheliomata—are usually devoid of pigment and have a histology entirely different from that of the melanomata. The development of the tumours in grey horses is aetiologically connected with the progressive diminution in the amount of melanin in the hairs and further evidence is required regarding the histology of the skin in foals and horses under the age of 5 years. No satisfactory theory regarding the acquirement of neoplastic characteristics by normal melanoblast cells of the horse's skin has yet been presented.—J. MCFADYEAN.

LAJA, F. (1933). Pahaloomulise veiste peataudi (Coryza gangraenosa bovum) etioloogiast ja epidemioloogiast. [**Bovine Malignant Catarrh. Aetiology**

and Epidemiology].—*Eesti Loomaarst. Ring.* **9.** 33-37 and 69-75. 1 table. [11 refs.] [Abst. from abst. in German by H. RICHTER (TARTU)].

This disease is not uncommon in Estonia, some 1,500 cases in cattle and 14 cases in sheep having been diagnosed since 1922. The incidence in various parts of the country is shown. Season and climate appear to have no influence on the disease and in the majority of cases direct transmission among cattle cannot be demonstrated ; isolated cases tend to occur in particular localities year after year.

The author suggests that geological and nutritional factors may be associated with the incidence of this disease.—J. E.

LOCKAU, U. (1933). Die Lymphadenose des Rindes. [**Lymphadenosis of Cattle**].—*Berl. tierärztl. Wschr.* **49.** 177-180. 2 tables, 1 map. [3 refs.]

The author defines the disease as one in which swellings occur along the course of the lymphatic vessels throughout the body. The spleen may or may not be altered and the condition may be leucaemic or aleucaemic in character. It was first described by DU TOIT, KNUTH and VOLKMANN. Figures have been collected showing the incidence of the disease amongst slaughter animals and these indicate that the incidence is highest in July and October and is lowest at the end of the winter and in the early spring. When the sources of these cases were ascertained, it was found that in the course of 2 years almost every district in Germany had produced at least one case of lymphadenosis. There appears to be some evidence to suggest that certain strains of cattle show a greater predisposition to the disease than others. The significance from the point of view of state veterinary control is discussed.—E. J. PULLINGER.

VAN VLOTEN, J. G. C. (1932). Neuritis tuberculosa (?) van de nervi ischiadici bij het paard. [**Neuritis tuberculosa (?) of the Sciatic Nerves of a Horse**].—*Tijdschr. Diergeneesk.* **59.** 1057-1060. 7 figs. on 4 plates. [Summaries in English, French and German : abst. from orig.]

A chronic inflammation of the sciatic nerves was found at autopsy in an army horse that suffered from posterior paralysis. On microscopic examination the inflammatory centres bore a great resemblance to tubercles. Tubercle bacilli, however, were not found. There was a peculiar formation of a central canal surrounded by ependymal cells in the left ischiatic nerve, but no direct communication with the spinal cord could be demonstrated.

—J. VAN DER HOEDEN (UTRECHT).

BROWN, J. M., SAVAGE, A., & ROBINSON, A. D. (1933). **A Report of Some Investigations into the Cause of Sweet Clover (Melilotus) Disease.**—*Sci. Agric.* **13.** 561-565. 5 tables. [6 refs.]

Sweet clover disease of cattle is quite common in Manitoba and may cause serious loss in a herd. The prevailing theory that mouldy clover hay is the cause was investigated by the authors. In the first experiment 6 heifers were fed over 188 days with well-cured sweet clover (*ad lib.*), 2 lb. daily of ground barley and distilled water. The blood calcium and phosphorus were estimated at 21-day intervals. No sign of the characteristic disease [see this *Bull.* **2.** 385 and 415, and **3.** 37.] appeared and the blood calcium and phosphorus remained within their normal limits.

The second experiment resembled the first with the exception that the clover hay employed had first been heavily infected artificially during stack building with a culture of *Penicillium brevicaule*, a mould isolated from hay which had previously caused the disease. The result was also negative.

In the third experiment 4 beasts were gradually put on to the sweet clover hay, notable for a dark brown colour and tobacco odour, which had already killed 9 cattle on a farm. 21 days elapsed before the beasts were consuming a full ration of the hay and on the 42nd day the typical disease appeared in 2 beasts, extensive subcutaneous haemorrhages appearing. Defibrinated blood, a specific remedy, was given and one animal was saved whilst one died. The remaining 2 beasts were not visibly affected, but their blood also showed an increased clotting time.

Some further experiments on 2 rabbits confirmed the results of RODERICK and SHALK [(1931). *N. Dakota Agric. Expt. Sta. Bull.* 250].

This work disproves the theory that sweet clover hay moulds are the cause of the disease.—J. E.

MEYER, D. B. (1932). **A Clinical Study of Forty Cases of Disease of the Reproductive Organs of the Cow.**—*J. Amer. Vet. Med. Ass.* **81.** 62-70. 1 table.

This article consists principally of a long table covering 8 pages presenting clinical records of 40 cases of diseased genital organs of the cow. 34 cases were treated for sterility, 9 of these cases also being treated for retained foetal membranes. The 6 remaining cases were treated for retained foetal membranes only. The treatment in most cases included uterine douches with iodine solution, varying in strength from 2 to 5 per cent., according to the degree of metritis present. In treatment of retained foetal membranes, mineral oil and iodoform seem to give the most reliable results, but the author recommends the trial of 0·8 per cent. pepsin solution containing 0·5 per cent. hydrochloric acid, as he had some very satisfactory results with this method, and has found in laboratory experiments that the pepsin mixture digests foetal membranes to the extent of 91 per cent. within 48 hours. The records in the table are divided under the observations (1) previous to treatment ; (2) during the period of treatment and (3) subsequent to treatment, but the details given in the table do not lend themselves to abstraction.

—S. H. GAIGER.

KOHOUT, J. (1932). Zkusenosti o przcinach a therapii sterility skotu. [**Aetiology and Therapy of Sterility in Cows**].—*Klin. Spisy Skoly Zverol. Brno.* **9.** 175-217. [22 refs.] [Summary in German : abst. from orig.]

The author records the results of the clinical examination and treatment of 177 sterile cows. In 84 cases he found persistent corpora lutea, in 9 cases cysts of ovaries, in 3 cases sclerosis, in 32 cases pathological changes of the uterus, in 16 cases pathological changes in the uterus and ovaries, in 14 cases changes in the uterus and vagina, in 3 cases pathological changes of the vagina and in one case (a heifer) hypoplasia of the uterus and ovaries.

Seventy-two of those examined received treatment ; the methods of therapy depended upon each individual case and were as follows :—removal of the cysts and persistent corpora lutea, massage of the uterus and ovaries, irrigation of the vagina with disinfectant fluids and uterine treatment according to Albrechtsen's method. The best results of treatment have been obtained in the cases of hypofunction of the ovaries (100 per cent. of good results). Pathological conditions of the uterus caused by persistent corpora lutea were cured in 65 per cent. of cases. Almost identical results were obtained in the cases of catarrhal endometritis with or without cystic degeneration of the ovaries. Purulent endometritis not complicated with pathological conditions of the ovaries was treated with relatively good results, as 80 per cent. of cows became pregnant. Treatment of purulent endometritis complicated with cystic degeneration of the ovaries and of cows affected with pyometra was unsuccessful.—E. PRIBYL (BRNO).

HARE, T. (1932). **A Disease of Lactating Cows Associated with Intracytoplasmic Blue Bodies. Part I. Epidemiology, Symptomatology and Morbid Anatomy.** —*Vet. Rec.* **12**. 837-839.

Preliminary observations made on the epidemiology, symptomatology and morbid anatomy of a disease of lactating cows (variously known in different districts as " brain fever," " bovine hysteria," " pseudo-milk-fever," " deficiency disease," or " tetany "). The disease is apparently confined to cows at grass and can be classified as of acute, chronic, and mild types, the two former invariably being fatal. The main lesions found at *post-mortem* examination consisted of haemorrhages in the mediastinum, muscle and fascia of the neck, trunk and axilla, pleura, heart, lungs, liver, splenic capsule, and an interstitial emphysema of the bases or apices of the lungs.—J. R. M. INNES.

DIMOCK, W. W., & EDWARDS, P. R. (1933). **Infections of Fetuses and Foals.**—*J. Amer. Vet. Med. Ass.* **82.** 718-725. 2 tables.

This paper reveals that out of 386 aborted foetuses submitted to detailed bacteriological examination by the authors, 230 yielded negative findings. In 96 cases streptococci were isolated, in 22 cases *Bact. abortus equi*, in 6 cases staphylococci, in 4 cases *Bact. coli* and in 2 cases *Bact. equirulis*. Although in the majority of cases the results were negative, the authors feel that, had the placentae and mares been available for examination, the number due to streptococcic infection would have been greater.

Bacteriological examinations were also made of 273 foals which varied in age from those dead at birth up to 8 months. From 110 cases, *Bact. equirulis* was recovered and in 65 instances streptococci were isolated. *Bact. coli* was present in 13 cases, *Bact. abortus equi* in 6, *Corynebact. equi* in 5 and miscellaneous organisms in 11 cases. The results were bacteriologically negative in 63 foals. The authors point out that, in the foals examined, many showed definite evidence that infection originated previous to birth. This was particularly evident in the *Bact. equirulis* and streptococcic infections. The latter appeared to result from infection existing in the genital tract of the mare at the time of service, whereas *Bact. equirulis* and *Bact. abortus equi* infections are, in the opinion of the authors, post-conception infections, the mode of entrance being by the digestive tract and systemic circulation of the mare.—GWILYM O. DAVIES.

MARSH, H. (1932). **Diseases of Young Lambs.**—*J. Amer. Vet. Med. Ass.* **81.** 187-194.

A summary is given of a number of diseases affecting young lambs, including goitre, which occurs in those parts of the country in which iodine deficiency exists. The condition can be readily prevented by feeding iodized salt (1 oz. of potassium iodide in 300 lb. of common salt) to the ewes during gestation.

The addition of calcium phosphate to the diet of the ewe has been found of some prophylactic value in preventing the so-called " dirt-eating " or " bone-eating " in lambs.

A necrobacillosis of the liver is ascribed to umbilical infection, of which the predominant organism appears to be *Actinomyces necrophorus*. The disinfection of the umbilical cord constitutes an effective preventive measure.

A form of paraplegia and various conditions of arthritis are ascribed to umbilical and wound infection with indeterminate organisms. A specific arthritis, chronic in character, is believed to result from infection with *Erysipelothrix rhusiopathiae*.

A form of lamb dysentery which occurs during the first few days of post-natal

life is described. From the text, it would appear that this is distinct from lamb dysentery of the *Clostridium welchii* type. Good sanitation is advocated as the most effective prophylactic measure.

The condition known as " white-muscle disease " attacks lambs about one month old. The symptoms are manifested by a peculiar stiffness of gait and difficulty in rising from the recumbent position. There is little evidence, however, of systemic disturbance. On autopsy, " there is a degeneration of certain groups of muscle fibres, which show as white areas. The distribution of these areas is bilaterally symmetrical. That is, if a certain muscle in the thigh of the right leg shows such an area, the corresponding muscle of the left leg will show a similar area. The lesions occur in the muscles of the limbs and back, and also are found frequently in the heart muscle. It has been determined that the white appearance of these groups of muscle fibres is due to a deposit of calcium phosphate," and it is suggested that the condition is due to a disturbance of the normal calcium-phosphorus balance.—J. Russell Greig.

Lytle, W. H. (1933). **Pasture Diseases of Sheep.**—*J. Amer. Vet. Med. Ass.* **82.** 726-731. [Paper presented to the 69th Annual Meeting of the Amer. Vet. Med. Ass.]

In this paper the author discusses in a general manner the various factors which play a part in successful sheep farming, paying particular attention to the more important diseases of sheep and the conditions predisposing to their occurrence.—Gwilym O. Davies.

Fooy, J. P. (1932). Over Braken bij den Hond als Symptoom van versichillende Zicktetoestanden. [**Vomiting in the Dog as a Symptom of Different Disease Conditions**].—*Ned.-Indisch. Blad. Diergeneesk.* **44.** 337-363. [15 refs. in text].

Vomiting in dogs has been frequently observed in the Dutch East Indies. The author discusses diseases which caused this symptom and he also discusses the differential diagnoses.

First of all the physiology of the vomiting is discussed. The author differentiates between gastro-enteric vomiting and the toxic vomiting caused by irritation of the vomiting-centre. This will be found in uraemia, pyometra and perhaps also in Weil's disease.—B. J. C. te Hennepe (Rotterdam).

Gilruth, J. A. (1932). **Some Observations on the Importance of Nutrition in Relation to Diseases of Livestock.**—*Austral. Vet. J.* **8.** 162-172. [Presidential Address, Austral. Vet. Ass., Sydney, August, 1932].

The preamble of this address is a review of the old methods of treating diseases, with remarks on empiricism and the value of accumulated experience dating from prehistoric times. Empiricism is not necessarily unsound. The natural inquisitiveness of the clinician causes him to ask why, of all the animals apparently equally and simultaneously exposed to any infection, only some should become afflicted even in the case of very infectious diseases ; why some recover, why his treatment should be efficacious in one complaint and totally futile in another not markedly different, and why some diseases only affect animals in good condition, while others seem to have a preference for the ill-nourished. As yet the answer is far from complete. Terms such as idiosyncrasy and individual resistance are not explanatory. The study of this must be approached bearing in mind that domesticated animals are the result of careful and long selective breeding, that they are maintained under more or less artificial and consequently unnatural conditions, and that neither their improvement nor their maintenance

is effected by considerations of their own benefit, but by the desire that they should serve the economic ends of mankind.

That nutrition plays a highly important and as yet a very imperfectly understood part in disease, is fully realized. " Black-leg " attacks the plethoric and young bovine, while the old and the lean are unsusceptible. A comparable condition in sheep is the " braxy " group of diseases. Braxy-like disease of sheep in Western Australia, studied by BENNETTS and demonstrated by OXER to be serologically identical with so-called " pulpy kidney of milk lambs " is again comparable, it being rare that sheep in store condition are attacked, or at all events succumb. BENNETTS' contention that a lethargic condition of the small intestine is a necessary predisposing factor in the development of this disease, by permitting proliferation of the causal organism, *Clostridium ovitoxicum*, is discussed. Certain classes of food have a predisposing influence on the onset of certain diseases. When sheep were fattened on swedes in the south of New Zealand the mortality often assumed grave importance ; it was found that access by the sheep to native pasture of a comparatively innutritious nature proved an effective preventive. This suggested the provision of ordinary straw when native grass was unavailable and it proved just as effective as the dry natural pasture. The theory held was that the almost frozen turnip lowered the resistance of the alimentary tract to penetration of its walls by some specific organism and that animals which had access to the pasture or straw before consuming the cold roots in the morning were rarely affected. Condition, however, appeared to play an important part as practically only those sheep in the best condition were affected.

Xerophthalmia in rabbits and epithelioma contagiosum in fowls are quoted as diseases which, though actually due to micro-organisms, require the predisposing factor of vitamin deficiency for the disease to appear, even although the source of infection may still persist.

It is now known that certain native tribes in India suffer from pulmonary affections and tropical ulcers more than other tribes, owing to the diet being deficient in calcium and vitamins. Again, age and condition have an important bearing on the severity of certain protozoan diseases, notably " redwater " or " tick fever," calves being resistant while cattle in prime condition are most susceptible. The reason for this is not known.

Helminth infestations are most serious in the young growing animal. It is a curious and not understood fact that adverse conditions whether of food supply, or climate, or both, which militate against growth in young animals, benefit the development to a stage of maturity of any larval parasites which may be ingested, and the converse is true.

The author stresses the point that what may be an adequate and balanced ration for the young under one set of climatic conditions may be quite inadequate and unbalanced in another. Poverty-stricken sheep are known to be more prone to serious lice infestation than the robust and it has been found that the buffalo-fly in Java shows a decided preference for cattle in poor condition. Appetite is a faculty of tremendous importance and animals, when given the opportunity, make a wise and natural selection of food.

In discussing phosphorus deficiency in soils, the author suggests the possibility that the marked carnivorous appetite of cattle and sheep in phosphorus-deficient districts may be due not merely to a craving for phosphorus, but for some other element.—R. G. LINTON.

I. DRYERRE, H. (1932). **Lactation Tetany.**—*Vet. Rec.* **12.** 1163-1169.
II. HOPKIRK, C. S. M., MARSHALL, D., & BLAKE, T. A. (1933). **Grass Tetany**

of Dairy Cows.—*Ibid.* **13.** 355-361. 5 tables. [15 refs.]

I. The author discusses lactation tetany as it occurs in England and Scotland, comparing it with grass tetany of Holland [see this *Bull.* **3.** 91 and 202]. Clinical symptoms of acute and subacute cases are described and the general results of blood analyses are given. The most characteristic feature of the blood picture was hypomagnesaemia, the average serum magnesium being 0·39 mg. per 100 c.c. as against an average of 1·9 mg. (range 1·8 to 3·13 mg.) for normal cows. In many cases there was also slight hypocalcaemia but the fact that this was not invariable is indicated by the average value 9·3 mg. calcium per 100 c.c. serum ; only 2 cases were below 7·9 mg. Serum phosphate was little changed—average 4·54 mg. inorganic phosphorus per 100 c.c. as against average normal of 4·66 mg. Haemoglobin and sodium chloride were generally 5 to 15 per cent. below normal.

The physiological significance of magnesium is discussed and the nervous symptoms related to the calcium/magnesium ratio of the blood. The aetiology of the disease is discussed speculatively but the author does not commit himself to one specific theory of causation.

As a therapeutic measure, intravenous or subcutaneous injection of magnesium lactate is recommended—33 g. per l. of water, or 33 g. magnesium lactate with 8 c.c. of lactic acid and 25 g. of neutral sodium phosphate per l. The lactate is suggested as preferable to the chloride or sulphate and the author does not agree with SJOLLEMA's combination of calcium and magnesium salts [see this *Bull.* **3.** 202].

Occasional oral dosing with magnesium sulphate and free access to licks composed of salt, sodium phosphate and ferric oxide are suggested as useful from the prophylactic point of view.

The discussion following the paper is recorded ; 17 speakers took part and provided considerable variety of experience of the disease.

II. Records grass tetany or lactation tetany in New Zealand. The disease has been recognized in the Waikato district for at least 15 years but is now more prevalent and has come to be expected as a seasonal occurrence from the third week in July until the end of September. Taranaki, with intensive dairying and similar methods of farming, is apparently free from it. Distribution in other parts of the North Island is discussed.

Particulars concerning soil, farm practice, fertilization and mineral supplies are given. Comparative analyses (in respect to mineral components) are given for pastures from affected and unaffected farms and for blood of affected and unaffected cattle.

The characteristics of the disease are similar to those described by SJOLLEMA in Holland and DRYERRE in Britain. The range of serum magnesium was 0·39 to 1·5 mg. per 100 c.c., as against 0·8 to 2·5 mg. for cows on an unaffected farm [0·8 mg. is an exceptionally low value for normal serum]. In distinction to DRYERRE's data [I. above] serum calcium was frequently much below normal—average of 18 cases in 1932 being 6·8 mg. per 100 c.c. of serum, and of 17 cases in 1931 being 7·2 mg. as against 9·6 mg. for 8 unaffected cows. The figures for inorganic phosphorus are difficult to interpret owing to the very wide range recorded. Experiments on aetiology and on treatment are described. Calcium/magnesium therapy (Sjollema method) gave no useful results. Chloral hydrate, usually *per rectum*, was useful in giving nerve rest. Aetiology is discussed but no definite conclusions are drawn.

[In the discussion following I, and in the general tone of II, the distinction between " hypomagnesaemia " and " magnesium deficiency " is not sufficiently emphasized—see this *Bull.* **3.** 727].—H. H. GREEN.

PUBLIC HEALTH.

I. Hopkirk, C. S. M., & Gill, D. A. (1933). *Br. abortus* **in Town Milk Supplies.**—*Vet. Rec.* **13.** 261.

II. Gaiger, S. H., & Davies, G. O. (1933). *Brucella abortus* **in Cow's Milk.**—*Ibid.* 901-902.

I. Of 642 guinea pigs inoculated with samples of mixed milk at Wallaceville, New Zealand, during the last two years, 231 (36 per cent.) later gave positive reactions to the agglutination test for *Br. abortus* and lesions were found in 155 (24 per cent.) of these. The distribution of these lesions was as follows :—spleen 145, testes 5, spleen and testes 2, pelvic abscess 1, mesenteric lymph glands 1 and liver 1.

From the milk samples employed in the above, culture isolation on gentian violet serum agar in 10 per cent. carbon dioxide, only succeeded 13 times (2 per cent.). In all but one of these cases the agglutination test was in agreement ; in the exception the inoculated guinea pig showed no sign of infection.

II. The authors tested samples of cows' milk, sent for diagnosis of tuberculosis, for *Br. abortus* infection by guinea pig inoculation. These animals were killed six weeks after infection and serum from their heart blood was subjected to the agglutination test.

200 milk samples involving 400 guinea pigs were tested. Results were positive with both test animals in 52 cases (26 per cent.) and with one test animal in 35 cases (17·5 per cent.), the remainder being negative. In guinea pigs which became infected, the blood serum was positive to the agglutination test at a titre of 1 : 80.

The spleens of the guinea pigs were examined and found enlarged in 48 *Br. abortus*-positive animals and normal in size in 83 infected animals.

Cultures were prepared from the spleens of 82 guinea pigs used in the work and yielded positive results in 9 cases.—J. E.

Laja, F. (1932). Die Bang'sche Infektion und die Milchergiebigkeit der Kühe. [**Bang's Disease and Milk Production**].—*Eesti Loomaarst. Ring.* **8.** 241-247. 4 tables. [Orig. in German].

By comparison of the milk yields of reacting and non-reacting cows belonging to 3 herds for a period of 5 years, the author has obtained figures which show that the losses caused by contagious abortion do not consist solely in the immediate loss of the calf and shortening of the lactation period, but that during subsequent lactations the milk yield is reduced by about 25 per cent. owing to the persistence of *Br. abortus* in the udder. [This estimate of the reduction in milk yield would be more acceptable if the presence of the streptococcus of chronic mastitis could be excluded].—S. J. Edwards.

Carrieu, & Lafenêtre. (1932). Fromage frais et fièvre ondulante. [**Fresh Cheese and Undulant Fever**].—*Le Lait.* **12.** 779-785. [18 refs.]

17 cases of undulant fever occurred in a village of about 1,000 inhabitants. In 8 cases the only possible source of infection was fresh cheese. The infection was traced to a herd of 57 goats in which 20 abortions and one case of bilateral orchitis had occurred. The herd was afterwards sold and taken to another village. The outbreak was successfully dealt with.

An outbreak in the human population of the village to which the herd had been taken was avoided by vaccinating the personnel of the farm and by pasteurizing the milk intended for sale or for cheese-making.

Another epidemic was traced to cheese sold by a travelling vendor : in fact,

it was possible to tell where he had been peddling his wares by the result amongst his customers.

As it has been shown that milk pasteurized by the low temperature method is suitable for cheese-making, the author thinks that it should be made obligatory.
—GEORGE SLAVIN.

MILLER, J. F. (1933). **Guarding Milk Supplies in Small Municipalities.**—*Vet. Med.* **28.** 78-80.

A radio address giving a popular account of the milk-borne diseases communicable to man. In the 14 years 1917 to 1931 the New York State Department of Health recorded 100 outbreaks of disease caused by the consumption of contaminated milk, 3,759 persons being affected. In 80 per cent. of these cases the contamination occurred on the dairy farm. " Carriers " on the farm were responsible for 65 typhoid fever outbreaks. The article closes with the claim that the veterinarian, by his training, is best fitted to supervise the people's milk supplies.—F. BULLOCK.

MAGRI, B. (1932). L'applicazione del fenomeno di Schern-Gorli per la differenziazione del latte crudo da quello riscaldato. [**The Application of Schern-Gorli's Phenomenon to distinguish Fresh from Heated Milk**].—*Clin. Vet. Milan.* **55.** 910-915. [5 refs.]

SCHERN and GORLI [(1930). *Berl. tierärztl. Wschr.* **46.** 893.] observed that red corpuscles behave differently when placed in fresh and in heated milk, and the author of this paper has attempted to find a practical use for this phenomenon as a method for detecting the sale of pasteurized milk added to fresh milk or old milk preserved by heating.

The technique of the method consists in either adding 5 drops of a 1 per cent. suspension of medicinal animal charcoal or 1 per cent. of carmine in normal saline to 5 c.c. of milk ; or adding 1 drop of a 1·5 per cent. suspension of washed sheep red corpuscles in normal saline to 1 c.c. of milk. Fresh milk is indicated if the material added remains on the surface forming a coloured ring and sedimentation occurs slowly. The reaction is negative if the material added collects at the bottom of the tube without forming a ring on the surface of the milk. The reaction varies greatly in individual cases and may be hastened by placing the tubes in an incubator.

It was found that ring formation still occurs with milk pasteurized below 62° to 64°C. for 30 minutes, but the intensity of the ring decreases if the milk is heated beyond this temperature and the reaction is lost completely with boiled milk. It is also possible by this method to detect a very small amount of fresh milk (2 per cent.) in heated milk.—J. A. NICHOLSON.

I. TACHON, PERROT, & VERGE, J. (1933). L'Anesthésie électrique des animaux de boucherie. [**Electrical Stunning for Slaughter Animals**].—*Rev. gén. Méd. vét.* **42.** 193-214. 4 figs. [67 refs.]

II. KOK, D. J., & VAN HARREVELD, A. (1933). Ueber elektrische Betäubung. [**Electrical Stunning**].—*Berl. tierärztl. Wschr.* **49.** 359-362. 5 figs. [1 ref.]

I. A general survey of the work done in connection with electrical stunning, from the early experiments of Leduc in 1902 to the perfected electric stunning instruments of Müller, Wienberger and others. The article includes a description of the methods at present used for the electrical stunning of abattoir animals, the tongs and various animal traps, as well as the summarized opinions of experts in different countries. It is concluded that the electrical stunning method satisfies

the following six conditions :—rapid production of unconsciousness, perfect bleeding, lack of muscular haemorrhages, safety for the slaughtermen and abattoir personnel, greater economy than with other methods, and ease of application. The authors recommend the method as most humane and hygienic, simple and economic, and worthy to be substituted (particularly in France) for what they describe as the primitive and repulsive methods in use in many abattoirs.

II. After a general survey of early experiments on electrical stunning, the authors describe some experiments on dogs and other animals. Blood pressure and respiratory readings were taken and are reproduced in the figures. It is concluded that the best position for the placing of the electrodes is on the top of the head, so that the brain is in the line of current. A current of 60 volts is recommended. [See this *Bull.* **3.** 325, for references to similar work by British authors].—D. J. ANTHONY.

SAAR, F. (1933). Krüptorhismist sigadel ja selle hinnangust lihavaatuses. [**Cryptorchidism in Pigs and Decision as to its Significance at Meat Inspection**].—*Eesti Loomaarst. Ring.* **9.** 79-81. [3 refs.] [Abst. from abst. in German by H. RICHTER (TARTU)].

In recent years cryptorchidism in swine has increased in Estonia. In 1930 the percentage incidence in slaughtered pigs was 0·19 per cent. (1·3 per cent. in one abattoir). The flesh of cryptorchid pigs has a peculiar and undesirable odour, which can best be demonstrated if a small piece of fat is heated over a flame : the odour at once becomes evident before the smell of combustion arises.—J. E.

ANDRESEN, F. (1932). Ueber das Vorkommen von Bakterien in Eiern. [**The Incidence of Bacteria in Eggs**].—*Inaug. Diss. Berlin.* pp. 44. 1 table. [39 refs.]

Eggs from a variety of different sources were examined bacteriologically as follows :—the eggs were washed carefully, soaked for 10 minutes in corrosive sublimate solution, washed in alcohol, placed in a stand and flamed until the shells browned and then opened with a sterile implement. Standard loopfuls of the contents were inoculated on to agar plates for aerobic incubation and on to glucose agar or glucose blood agar for anaerobic incubation. The results in 586 eggs examined thus showed 43 to be infected with organisms. Of these, 3 contained streptococci ; 16, other types of cocci ; 13, *Bact. pullorum* ; 2, *Pseudomonas pyocyanea* and 9, other bacilli.—E. J. PULLINGER.

THERAPEUTICS.

CURASSON, G. (1932). Le traitement curatif de la péripneumonie bovine par le néosalvarsan. [**Curative Treatment of Bovine Contagious Pleuro-Pneumonia with Neosalvarsan**].—*Bull. Acad. vét. France.* **5.** 173-178. 2 tables. [2 refs.]

The field treatment of 168 cattle suffering from pleuro-pneumonia with intravenous injection of novarsenobenzol (neosalvarsan), in doses varying from 2 to 2·7 g., resulted in 11 deaths and 157 recoveries. The mortality in untreated animals in the same epizootic varied from 50 to 75 per cent. Nine animals were treated at the laboratory and, of these, 6 recovered and 3 died. In the 3 animals which died both lungs were involved. As a rule the temperature dropped 24 hours after the injection and became normal 4 or 5 days later. The effect of field treatment was judged by examination 2 months later. [It is not recorded whether recovered animals were slaughtered to ascertain whether recovery was complete or whether they remain a danger as " lungers "].—U. F. RICHARDSON.

I. DA COSTA, S. F. Gomes. (1932). Action de quelques composés antimoniaux sur les Helminthes du Porc et du Chien. [**The Action of Antimonious Drugs on Helminths of the Pig and the Dog**].—*C. R. Soc. Biol. Paris.* **110.** 1054-1056. [2 refs.]

II. UNDERWOOD, P. C., & WRIGHT, W. H. (1932). **Additional Observations on the Use of Fouadin in the Treatment of** *Dirofilaria immitis* **Infestation in the Dog.**—*J. Parasitol.* **19.** 180. [Presented at 8th Annual Meeting of the American Society of Parasitologists, Atlantic City, New Jersey, December, 1932].

I. The author mentions experiments *in vitro* and *in vivo*. *In vitro* a 1 per cent. solution of tartar emetic in normal saline is found to be inactive on ascaris ; if, however, the drug is fed to a dog and shortly afterwards the intestinal contents are recovered, it is found that the tartar emetic is now active and paralyses ascaris *in vitro*. In a like manner it has been shown that the anthelmintic activity of stibosan, neostibosan and antimosan is greatly enhanced after circulation in the blood stream. The observations suggest that these drugs are not likely to prove of value against ascaris.

II. Four dogs, known to be infected, were treated with intramuscular injections of fouadin daily for 6 days each week, the initial dose each week being 0·5 c.c. to 1 c.c. and being increased to a maximum of 3 c.c. The microfilariae were found to disappear from the circulation in 20 to 25 days, i.e. after 21 to 33 c.c. of the drug had been given. Live dirofilariae were found in the heart of one dog killed 6 days after the disappearance of microfilariae from the blood and also in one dog which died 3 days after the disappearance of microfilariae, but embryos from eggs in the uteri of the females appeared to be dead. At the time of writing, the blood of the 2 remaining dogs was still negative for microfilariae 11 and 47 days after their disappearance : a third animal not included in the experiment is mentioned, in which microfilariae had been absent from the circulation for 333 days following the use of fouadin.—E. L. TAYLOR.

I. TAYLOR, E. L. (1933). **Notes on Worms in Foxes.**—*Vet. J.* **89.** 20-23.

II. HANSON, K. B. (1933). **Tests of the Efficacy of Single Treatments with Tracheal Brushes in the Mechanical Removal of Lungworms from Foxes.** —*J. Amer. Vet. Med. Ass.* **82.** 12-31. 7 figs., 9 tables. [2 refs.]

I. This article, written in a semi-popular style, mentions in particular some features of the problem of lungworm control in foxes. Reference is made to the tracheal brush for the removal of *Capillaria aerophila*, but it is pointed out that sanitary measures involving special floors for the pens form the best means of control yet known.

The possible importance of prenatal infestation with *Toxocara canis* is also discussed ; it is pointed out that prenatal infestation is probably the usual mode of entry for this parasite and that this infection may be by no means a negligible cause of loss in early life.

II. Hanson has for some time advocated the use of the tracheal brush in the control of *Eucoleus aerophilus* in foxes and here gives a detailed account of the method of passing the instruments and of the restraint of the animals. An account is also given of some critical tests of the treatment ; these show an efficiency of 70·8, 80, 82·86, 87·96 and 95·19 per cent. for *E. aerophilus* actually situated in the trachea and an efficiency of 29·57, 38·41, 52·86, 53·67 and 60·18 per cent. against the entire *E. aerophilus* infestation. It is, however, of little use against *Crenosoma vulpis* as the great majority of these worms remain in the bronchi and bronchioles where they are beyond the reach of the tracheal brush.

In contributing to the discussion which followed this paper, SHILLINGER mentioned an instance which had come to his notice where the superintendent of a ranch had used the tracheal brush on the foxes every other day for some time without causing symptoms of irritation, which is evidence of the harmless nature of the treatment.—E. L. TAYLOR.

KOOV, A. (1933). Täheldusi lammaste distomatoosi ravimisel distooliga. [**Notes on the Treatment with Distol of Fascioliasis in Sheep**].—*Eesti Loomaarst. Ring.* **9.** 123. [Abst. from abst. in German by H. RICHTER (TARTU)].

A short article reporting good results with distol against liver fluke infestation in sheep. It is important that the animals be fed at the time on carbohydrate, easily digested food.—J. E.

RINGSEISEN, J. (1933). Welche Arzneimittel gehen in die Milch über ? [**Which Drugs are excreted in the Milk ?**]—*Münch. tierärztl. Wschr.* **84.** 229-234. [104 refs.]

This is a review of the veterinary literature on the subject, in which quotations from numerous experiments are made and conclusions drawn. It is pointed out that some negative results, in which small doses of the test drug were given, might not hold good with larger or repeated doses. It appears to be agreed that the following drugs are excreted in milk :—alcohol (traces), aloes, arsenic, atropine, bismuth, chloroform, cytisin (laburnum alkaloid), colchicin, croton oil, ether, hexachlorethane, iodine, iron, lead, mercury, quinine, ricin, salicylates, strychnine, tartar emetic, tetrachlorethylene, turpentine and zinc.

Drugs of which there is no evidence of excretion in the milk include aniseed oil, antimony, coniin, chloral hydrate, digitalis, male fern, pilocarpine, physostigmine, opium, solanin, sulphur and yohimbin.—J. E.

HULTÉN, O. (1933). Trypanblatt och Bang-abort. [**Trypan Blue and** *Br. abortus* **Infection**].—*Svensk Vet.-tidskr.* **38.** 92-107. 2 tables. [6 refs.] [Summary in English : abst. from orig.]

SCHUBERT in an article [" Die Chemotherapie des inf. Abortus Bang mit Trypanblau."] (1929). *Wien. tierärztl. Mschr.* **16.** 913. describes the success of his method of treatment of infectious abortion with trypan blue. His conclusions are not reliable because his experiments were carried out without control animals.

To test the efficacy of this treatment, the author followed SCHUBERT's technique exactly in 2 infected herds. Three injections, each of 100 c.c. of a 1 per cent. solution of trypan blue, were given intramuscularly at the side of the neck. The injection seemed painful, but no untoward sequelae, such as abscesses or necrosis, were seen. An important detail is that the blue colour may remain in the meat of treated animals for as long as 6 months after the 3rd injection.

In the experimental herds abortion took place in both positive and negative controls and the general results of the experiments were unsatisfactory.

In guinea pigs, trypan blue had no effect on the normal course of the disease, while in agar cultures the growth was retarded, but only for 2 or 3 generations.

The author concludes that his own results and those of SCHUBERT were only obtained by thorough segregation and disinfection and that trypan blue has had very little effect on the course of the disease.—A. A. FORSYTH.

I. SEELEMANN, M. (1933). Einige praktisch-wichtige Winke für die Entozonbehandlung. [**Some Practical Points about Entozon Treatment**].—*Tierärztl. Rdsch.* **39.** 364-365. 2 tables.

II. LEHR, L. (1933). Beitrag zur Behandlung von Metritiden und der Streptokokkenmastitis der Kühe mit Entozon. [**Treatment of Metritis and Mastitis of Cows with Entozon**].—*Wien. tierärztl. Mschr.* **20.** 481-486.

I. Developing the entozon infusion treatment for mastitis [see this *Bull.* **3.** 101.], the author here gives some practical advice on the preparation of entozon solutions, the avoidance of their contamination during use in the stall, the instruction of the milking personnel by a leaflet, the text of which is given in full, and a suggestion for the use of 2 types of printed forms to be filled up by the practitioner.

Entozon solutions should not be made with hard water as the calcium in such water combines with the entozon to a small extent, thus weakening the solution. Hard water should be boiled and filtered just before use. Aluminium cans are recommended as containers for large quantities of entozon solution, when several cows have to be treated at one time. A glass vessel should be used for the actual infusion and the air inlet pipe should be provided with a filter to exclude dust. The author's original infusion technique remains unchanged.

II. METRITIS.—The author gives a short review of the literature and reports good results in the treatment of acute or chronic metritis with entozon pessaries and/or entozon solution prepared from granules.

MASTITIS.—Five cases of acute mastitis were cured after entozon irrigations according to Seelemann's method.—J. E.

REINSTORF, A. (1933). Sieben Jahre erfolgreiche Behandlung des gelben Galtes. [**Seven Successful Years of Mastitis Treatment**].—*Berl. tierärztl. Wschr.* **49.** 309-312. 1 table. [12 refs.]

This is a lecture for veterinarians giving a general account of mastitis control and refers to the prevention of infection in a clean herd, the prevention of dissemination in a herd already infected and the treatment of affected cows. The author gives the history of mastitis in a herd which had been under his supervision since 1926. Although heavily infected at that time, it is said to be " clean " now. Affected cows were treated with rivanol udder infusions, light diet and vaccination, healthy in-contacts also being vaccinated. [It is not stated whether the vaccines were autogenous].

The results are illustrated in a table. No case of mastitis has occurred since 1931.—J. E.

CLAPHAM, Phyllis A. (1933). **On the Prophylactic Action of Vitamin A in Helminthiasis.**—*J. Helminthol.* **11.** 9-24. 6 tables. [33 refs.]

Those who have previously carried out investigations on this point have found that a deficiency of vitamin A lowers the resistance of an animal to parasitic worms, permitting more worms to develop and to grow to a larger size. Clapham's observations on *Heterakis gallinae* in chicks on a very low vitamin A diet do not agree with these results as the vitamin content of the diet appeared to exert no influence on the development of the worms. Further observations, however, carried out on *Parascaris equorum* in white rats indicated a lowering of the host's resistance when on a diet deficient in vitamin A. Observations were also made showing that the eggs of *H. gallinae* retain their infectivity after passing through the gut of the earthworm.—E. L. TAYLOR.

SANTONI, L. (1932). La ormonizzazione sessuale per via endoperitoneale nella practica ostetrico-ginecologica veterinaria con particolare applicazione alla sterilità di ambo i sessi. [**The Intraperitoneal Administration of the Sexual Hormone in Veterinary Obstetro-Gynaecological Practice with Special**

Application to Sterility in Both Sexes].—*Clin. Vet. Milan.* **55.** 611-625. 8 figs. on 3 plates. [30 refs.]

The influence of liquor folliculi on the reproductive organs is shown by such changes as congestion of the genital apparatus, development of follicles in the ovary and the onset of oestrus, an increase in the secretion from the mucous membrane of the uterus and vagina and hyperplasia of the mammary gland. Oestrus always sets in after the enucleation of the corpus luteum and massage of the ovaries ; this is thought to be due to the absorption of the extravasated liquor folliculi from the peritoneum, but substances from the corpus luteum inhibiting the ripening of the follicle and so delaying the onset of oestrus for 6 or 7 days are also absorbed. These factors suggested to the author of this paper that in the treatment of sterility the intraperitoneal injection of liquor folliculi without enucleation of the corpus luteum should be of practical use, and that less liquor folliculi should be required than when it is given by the more usual subcutaneous, intramuscular or intravenous injections.

The preparation used in these cases was liquor folliculi taken from mature Graafian follicles with the addition of a small quantity of thyroid extract and carbolic acid (the latter substances appear to intensify the action of the liquor folliculi). In females, 10 to 15 c.c. doses are injected with surgical precautions through the hollow of the right flank directly into the peritoneal cavity. In male animals the solution is injected into the tunica vaginalis of the testicles.

From observations extending over a number of years, this treatment is claimed to have been instrumental in procuring the onset of oestrus in cows which had not shown it previously and, because of the neuro-vascular action of the liquor folliculi on the maternal cotyledons, in assisting the expulsion of the placenta in cases of retention. In cases of puerperal sepsis, 2 to 4 days treatment diminished the uterine exudate and hastened involution of the uterus.

In bulls and dogs with no apparent lesions of the sexual organs, impotency has been cured by the injection of follicular extract into the testicles.

It is considered that the intraperitoneal administration of liquor folliculi in clinical veterinary practice is greatly superior to the common methods of combating sterility in both sexes.—J. A. Nicholson.

POISONS AND POISONING.

Velu, H. (1933). Au sujet de l'étiologie et de la pathogénie du Darmous. (Fluorose spontanée des zones phosphatées). [**The Aetiology and Pathogenesis of "Darmous." (Spontaneous Fluorosis of the Phosphate Areas)**].—*Maroc-Méd.* March 15th. 207-210. [10 refs.] [Reprinted verbatim in *Bull. Soc. path. exot.* **26.** 616].

The author first discusses the incidence of spontaneous fluorosis and suggests that the condition of mottled enamel of teeth observed in human beings in various parts of America comes under this intoxication.

He then discusses " darmous " of sheep in North Africa and states his belief that the condition is not a pure fluorosis, but is also dependent upon mineral deficiency. An experiment was carried out on 3 lots of 10 lambs, all fed on the same diet and given in addition calcium fluoride to the amount of 0·1 per cent. in their grain ration. The first lot had no extra treatment, the second lot was given in addition tri-calcium phosphate and the third lot received twice as much tri-calcium phosphate as lot 2. At the end of 6 months, 5 lambs of the first lot had died of fluorine poisoning and all 10 showed tooth lesions of " darmous,"

whilst those receiving tri-calcium phosphate resisted poisoning to a much greater extent and only one or 2 lambs showed tooth lesions.

Discussing the pathogenesis of "darmous," Velu considers that fluorine belongs to the mineral group of "antifixators" of calcium, preventing the skeletal deposition of calcium during immaturity.

[For previous work on "darmous," see this *Bull.* **2.** 228 and 509].—J. E.

SCHICK. (1933). Das Dopen der Pferde. [**The Doping of Horses**].—*Zschr. Veterinärk.* **45.** 241-250. [14 refs.]

This is a general account of the chemical agents and physical (electrical) devices used in doping, and the measures adopted to control the practice. No new experimental work is quoted, and the references are mainly to such publications as have been made in Germany.—G. D. LANDER.

BROCQ-ROUSSEU, & ROUSSEL, G. (1933). Les empoisonnements par la Rhubarbe. [**Poisoning by Rhubarb**].—*Bull. Acad. vét. France.* **6.** 214-221. 1 table. [28 refs.]

This paper reviews and cites references to cases of poisoning by rhubarb, which have been noted in the literature as affecting man. According to the authors the only recorded case of rhubarb poisoning of animals is that of a goat reported by NAUDIN [see this *Bull.* **3.** 54].—G. D. LANDER.

STEYN, D. G. (1932). *Chrysocoma tenuifolia Berg* **Poisoning in Angora Goats and the Development of Tolerance.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 893-898. 1 table. [1 ref.]

This is a continuation of experiments with *Chrysocoma tenuifolia*, the cause of alopecia in kids and lambs in South Africa [see this *Bull.* **2.** 392.] and shows that Angora goats develop a degree of tolerance to toxic doses of the plant which depends upon the period of previous ingestion of non-toxic amounts. For instance daily dosage with 50 g. of the dried plant for a period of 6 days produced practically no tolerance whereas 50 g. daily over 26 days enabled a goat to tolerate 3 times the quantity which had previously produced symptoms (diarrhoea).—H. H. GREEN.

PHYSIOLOGY.

I. OTTO, J. S. (1932). **Studies in Mineral Metabolism XXII: Phosphorus, Calcium and Protein.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 703-732. 20 tables. [20 refs.]

II. GROENEWALD, J. W. (1932). **Studies on Mineral Metabolism XXV: The Effect of Calcium and Magnesium Supplements on the Growth of Merino Sheep.**—*Ibid.* pp. 799-803. 2 figs., 2 tables. [4 refs.]

I. Records results of balance experiments with two bovines to determine the extent of utilization of phosphorus from bone meal and from sodium phosphate.

II. Three groups of ewes and wethers were fed for a year on a basal ration of 1 lb. maize and ½ lb. of hay, containing only 0·09 g. [0·90?] of calcium but 2·55 g. of phosphorus. One group received a supplement of 7 g. chalk bringing the total calcium to 3·99 g., and a second group received magnesium hydroxide as well, bringing the total magnesium to 2·1 g. The calcium supplement showed up favourably, but the further addition of magnesium was disadvantageous.

[The figure 0·09 g. looks like a slip—½ lb. of any hay, however poor in calcium, would contain much more than this. The difference of course affects the significance of the experiment enormously].—H. H. GREEN.

ROMEZO, L. P. (1932). Teneur en iode des glandes thyroïdes des différentes races de Chiens de l'Uruguay. [**Iodine Content of the Thyroid Glands of Dogs in Uruguay**].—*C. R. Soc. Biol. Paris.* **111.** 535-536. 1 table. [1 ref.]

The thyroid glands of dogs were cut into small pieces and dried to a constant weight in an incubator. The iodine content of the dried powder was determined, less than 1 g. of material being used. The weights of the dried glands varied from 0·12 g. to 0·4 g. The percentage of iodine varied between 0·13 and 0·27. The method is claimed to be accurate to approximately 0·02 per cent. on such small quantities of iodine.—W. R. WOOLDRIDGE.

I. QUINLAN, J., MARÉ, G. S., & ROUX, L. L. (1932). **The Vitality of the Spermatozoon in the Genital Tract of the Merino Ewe, with Special Reference to its Practical Application in Breeding.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 831-870. 50 tables. [42 refs.]

II. QUINLAN, J. (1932). **The Vitality of the Spermatozoon and the Liberated Ovum in Domestic Animals with special reference to the relation of the time of Copulation during Oestrus to Conception.**—*J. S. Afric. Vet. Med. Ass.* **3.** 1-7. [16 refs.]

I. The period during oestrus at which service would be followed by the greatest number of conceptions, depends upon 2 factors, (1) the vitality of the spermatozoon in the genital tract of the ewe and (2) the vitality of the ovum after ovulation. The experiments described in this article were designed to throw light on these points.

It was found that the ejaculated semen from the ram is deposited in the cranial cavity of the vagina of the ewe and quickly reaches the cervical canal. Only a few sperms which enter the cervical canal reach the uterus and only a small percentage from the uterus reach the fallopian tubes. Spermatozoa were found to show motility in the vagina for a short time only ; they remain motile longest in the cervix, from which they pass upward in small numbers in search of an available ovum. A few may reach the fallopian tubes after such a short interval as 6 hours. Their motility is reduced after a stay of 12 hours in the tract, decreasing until a stay of just over 48 hours, when they then show morphological changes.

It was shown that spermatozoa are capable of satisfactorily impregnating an available ovum from the onset of oestrus until 30 hours later, the fertility within this period ranging from 70 to 100 per cent. A lowered fertility follows service after the 30th hour and there is a definitely decreased fertility during the later stages of oestrus, due to the short duration of the fertilizable vitality of the liberated ovum.

II. There is no reason why one service should not be sufficient to bring about conception in normal animals, if mating be allowed at the correct time during the oestrus period. To ensure this the following points are worth noting.

In the pig the ovarian cycle lasts from 18 to 23 days, oestrus lasting from 1 to 3 days. The follicles do not rupture before the 13th hour. The vitality of the sperms in the female genital tract varies greatly—from 16 to 40 hours. It would appear, therefore, that the best time for service would be about the 18th hour of oestrus. Oestrus follows parturition in 4 to 9 days.

In the sheep the ovarian cycle lasts from 16 to 18 days, the average duration of oestrus being about 40 hours. Ovulation takes place at the 36th to 48th hour. Most successful results are obtained with copulation between the 9th and 24th hour of oestrus.

In the mare the ovarian cycle lasts from 28 to 30 days, oestrus lasting 4 to 9 days. Ovulation occurs as a rule during the last 3 days of the oestrus period. The vitality of the sperm in the female tract is about 6 hours. It is desirable to mate mares not earlier than the 5th to the 6th day of oestrus.

In the cow the ovarian cycle lasts from 19 to 22 days. Oestrus lasts 18 to 24 hours and ovulation occurs late during the oestrus period. The life of the sperms is short, about 5 to 6 hours, as a rule. It is better to allow copulation not earlier than the 9th to the 12th hour of oestrus.—J. A. NICHOLSON.

I. WAYNE, R., ECKLES, C. H., & PETERSON, W. E. (1933). **Drying Up Cows and the Effect of Different Methods Upon Milk Production.**—*J. Dairy Sci.* **16.** 69-78. 2 figs., 4 tables. [4 refs.]

II. WAYNE, R., & MACY, H. (1933). **The Effect of Various Methods of Drying Up Cows on the Bacterial and Cell Content of Milk.**—*Ibid.* 79-91. 1 fig., 9 tables. [10 refs.]

I. The three most common methods of drying off a cow are by incomplete milking, delayed or intermittent milking and by a complete cessation of milking. Eighteen cows were used in this investigation and a comparison was made of these methods with regard to their influence on the quantity of milk and its constituents. The authors came to the conclusion that the complete cessation of milking can be safely recommended and can be commenced when the milk yield is as much as 1½ to 2 gallons per day. The time required to dry off a cow is considerably less than with the other methods and there appear to be no ill effects. There is a primary increase in pressure in the udder, but this is followed in a few days by resorption of the proteins, a rise in the pH and a reduction in the percentage of lactose. Once resorption has commenced any interference only causes delay.

II. This is a continuation of the above article in which are given the results of the three methods of drying off upon the bacterial and cell counts. Neither of these appeared to be influenced in the succeeding lactation. Intermittent and incomplete milking usually resulted immediately in a somewhat higher cell and bacterial count; this effect, however, was not permanent. After complete cessation the bacterial counts were lower at the commencement of the next lactation and rose slowly later.—N. S. BARRON.

TRAUTMANN, A., & SCHMITT, J. (1932). Beobachtungen an einer vegetablisch normal sich ernährenden, aber nicht wiederkauenden Ziege. Zugleich ein Beitrag zur Physiologie des Wiederkauens. [**Observations on a Goat Feeding on a Normal Diet, but not Ruminating, together with a Contribution to the Physiology of Rumination**].—*Arch. wiss. prakt. Tierhlk.* **65.** 559-573. 3 figs. [74 refs.]

In this paper, an account is given of a goat from which the reticulum was surgically removed three weeks after birth. After the operation, the animal took a diet normal to ruminants, but on no occasion was rumination ever observed and only once—towards the end of the experiment—did rumination-like movements appear. The animal was killed about seven months after the operation when hypertrophy of the rumen and slight regeneration of the reticulum were found. The hypertrophy of the rumen and the greatly increased motor activity of this organ which had been observed during life, were considered to be attempts to compensate for the loss of the reticulum.

From their observations on this animal and from their earlier work [(1932). *Arch. Tierernährung.* **7.** 421.], the authors suggest that for the power of rumination to develop, hard, coarse fodder must be taken by the animal and a reflex arc must

be present. Since rumination failed to develop after removal of the reticulum, this organ appears to them to be associated in this arc. Rumination does not depend on the omasum, but the oesophagus is the organ chiefly concerned in regurgitation.—J. A. NICHOLSON.

—. (1933). **Carbohydrates and Fatigue-Recovery.**—*Lancet.* **224.** 868. [3 refs.]

Since different carbohydrates are absorbed from the alimentary tract at different rates and since active exercise is accompanied by the utilization of carbohydrate and depletion of the available glycogen reserves, it is to be expected that ingested carbohydrate will aid fatigue and that the fatigue-recovery value of the particular carbohydrate used will bear some relation to its rate of absorption. A series of investigations carried out by LAIRD [(1933). *J. Indust. Hyg.* **15.** 89.], on 8 healthy young men showed that there was most resistance to the effects of fatigue on those days on which a 70 per cent. maltose diet was given, whereas a diet of 20 per cent. maltose and 48 per cent. sucrose did not appear to cause any improvement in the performance tests.—J. A. NICHOLSON.

LEPINAY, L. (1933). L'utilisation des rayons ultra-violets chez l'homme et chez les animaux. [**The Utilization of Ultra-Violet Rays in Man and Animals**]. —*Rev. Path. comp.* **33.** 455-464.

The influence of solar light upon the development of living beings is undisputed and it has been shown that this action is due to ultra-violet radiations. Ultra-violet rays may be produced artificially by carbon arc lamps, modified incandescent lamps or mercury lamps incorporating a quartz tube. These are somewhat expensive and the author describes in this paper a lamp which is a modified form of incandescent lamp. This is claimed to be obtainable at a reasonable price and may be worked with voltages from 100 to 250.

An account is given of the beneficial action of ultra-violet rays applied locally or generally to the human subject. In small animals, such as dogs, cats and fowls, the author has been successful in the treatment of rickets, anaemia, debility and cases of slow convalescence. A case is described in which glanders (farcy) in a horse was said to be successfully treated by exposure to a carbon arc lamp at 15 to 25 cm. from the limb, with exposures of 20 to 30 minutes. It is considered that general irradiation is indicated in old and young subjects showing debility and that for this purpose a continued application at 2·05 m. should be given. For local treatment as a general rule a distance of 50 cm. is advised. In ultra-violet rays veterinarians have a valuable therapeutic agent, easy to apply and at a price within the reach of all.—J. A. NICHOLSON.

KOMAROW, S. A. (1933). Ueber die Anwesenheit von sekretagogen Substanzen in dem reinen Magensaft des Hundes. [**Presence of Substances Stimulating Secretion in Pure Gastric Juice of Dogs**].—*Biochem. Zschr.* **261.** 92-105. 5 tables. [25 refs.]

The controversial question as to whether the stomach juice secreted under nervous control contains a substance capable of stimulating further gastric secretion is studied on oesophagotomized dogs with stomach fistula, using " sham feeding " to collect pure juice, injecting various substances isolated from this and noting the effects.

Demonstration of the presence of secretagogue substances is claimed. These substances fall into the group of nitrogenous bases precipitable by phosphotungstic acid, and soluble in alcohol as carbonates : a portion of them could be recovered in the histidin-arginine fraction by the silver-baryta method. The experiments

utilized 7 lots of gastric juice, in quantities from 500 c.c. to 6 l. and all extracts were free from protein and minerals.—H. H. Green.

McMaster, P. D., & Hudack, S. (1932). **Induced Alterations in the Permeability of the Lymphatic Capillary.**—*J. Exp. Med.* **56.** 239-253. 1 fig., 2 plates. [7 refs.]

In a previous paper [(1932). *J. Exp. Med.* **56.** 223.] a technique was described for testing the permeability of the lymphatics of the ear of the mouse. In ordinary circumstances there is active flow along the lymphatics toward the main collecting system. In the present paper the effect of various changes in conditions on the permeability of the ear lymphatics has been studied. A highly indiffusible dye – pontamine sky blue—was injected into the tissue at the margin of the ear. This dye escapes with some difficulty from the ear lymphatics. Mechanical stimulation, even when very slight, results almost immediately in a sharply localized increase in lymphatic permeability, which lasts for some hours. Permeability is increased by warming to 43°C., by irradiation with mild sunlight or by slight chemical irritation. [In this experiment the ear was painted with xylol, but no control ear was similarly treated with the brush alone]. The facts are discussed in relation to their bearing upon fluid accumulation within the tissue.—W. R. Wooldridge.

I. Marchlewski, L., & Urbanczyk, W. (1933). Studien in der Chlorophyllgruppe. XX. Ueber die Umwandlung des Chlorophylls im tierischen Organismus. [**Studies of the Chlorophyll Group. XX. Conversion of Chlorophyll in the Animal Organism**].—*Biochem. Zschr.* **263.** 166-172. 1 fig. [12 refs.]

II. Heimann, F. (1933). Ueber Bilirubinbelastungen bei Herbivoren unter normalen und pathologischen Bedingungen. [**Bilirubin Metabolism in Herbivora under Normal and Pathological Conditions**].—*Ibid.* 316-322. 5 tables. [6 refs.]

I. In the ruminant, part of the chlorophyll of the plant is changed into phylloerythrin (with the relatively simple formula $C_{33}H_{34}O_3N_4$) and can appear as one of the chromogens of the bile. In the present studies on the digestion of chlorophyll by the silk worm it appears that magnesium and phytol are split off but that the resulting phyllocyanin is only demethylated to a very small extent. The author holds that resorption of chlorophyll proceeds with great difficulty in the animal body, and that the only evidence that it occurs at all is the detection of phylloerythrin in bile. It is probable that this depends upon previous formation in the digestive tract and that there is no reason for assuming that chlorophyll can be used for haemoglobin formation. The therapeutic use of chlorophyll preparations for this purpose has, therefore, no logical basis.

II. Bilirubin is not present in the blood serum of normal rabbits and guinea pigs and if injected it rapidly disappears. [Absent also in cattle and sheep though present in horses—hence the van den Bergh diazo reaction, so useful in human medicine, is not applicable to ruminants].

The author injected various doses of bilirubin intravenously and took blood samples at intervals of 5, 10, 15, 30 and 60 minutes. With guinea pigs loading up the serum with 10 mg. of bilirubin established no van der Bergh bilirubin reaction. With rabbits on the usual alkaline diet [i.e. diet in which basic ions predominated over acid ions as they do in grass] it required loading up with 20 mg. to produce a brief positive reaction but on acid diet [oats, milk, bread—excess of acid ions, chiefly PO_4, as in human dietaries] 5 mg. sufficed to give an indirect van den Bergh reaction.

After phosphorus poisoning an indirect reaction followed injection of 10 mg. into rabbits, but did not do so with guinea pigs. Subjecting the animals to reduced atmospheric pressure had no influence. Injection of bilirubin after producing haemolytic icterus by pyrodin poisoning did not induce a van den Bergh reaction in rabbits on alkaline diet but gave an indirect reaction on acid diet.

—H. H. Green.

TECHNIQUE.

Wohlfeil, T., Sauerzapfe, E., & Lapidas, H. (1933). Zur Kritik einiger Methoden der Bakterienzählung. Vergleichende Untersuchungen zwischen der mikroskopischen Auszählung im Dunkelfeld, dem Plattengussverfahren und der Trockensubstanzbestimmung. [**A Criticism of Methods of counting Bacteria. Investigations comparing the Microscopic Dark Field Count, the Plate Count and the Estimation of Dry Bacterial Substance**].—*Zlb. Bakt. I. (Orig.).* **127.** 492-509. 12 tables, 2 graphs. [25 refs.]

The technique of the methods is described briefly. For the dark field method a Bürker counting chamber was used and the usual procedures were followed. [The exact steps taken to ensure accuracy, eliminating pipetting errors, etc. in the plating method, are not given.] The dry matter estimation followed drying the bacillary bodies *in vacuo* at 80°C.

The dark field microscopic method at its best gives an average range of error of ± 5·3 per cent. when numerous comparative countings are carried out. Within narrow limits thickening of the bacterial suspension reduces the percentage error. The method is a rapid and handy one for attaining a required concentration of bacterial suspension allowing for an error of ± 7 to 10 per cent.

With plate counts, plates should only be considered which show between 50 and 500 colonies. The fluid used for dilution should have certain properties which are discussed fully. Of those used in these experiments, phosphate buffer solution proved the most suitable. The dry matter estimation gave very variable results and was inferior to either of the above methods.—E. J. Pullinger.

—. (1933). **Microscopic Diagnosis of Parasitism in Domestic Animals.**—*Univ. Illinois Coll. Agric. & Agric. Expt. Sta. Circ.* No. 401. pp. 67. 88 figs. [28 refs.]

This circular is published principally for the use of veterinary practitioners to assist in the naked eye recognition of parasitic worms and in the recognition of mange acari and the eggs and larvae of parasitic worms under the microscope. A description is given, aided by excellent photographs, of some concentration methods and counting methods for the helminthological examination of faeces.

[The 2 methods of counting referred to, those of Stoll, and Stoll and Hausheer, are " dilution methods " and not " centrifugal flotation methods " as described. The excellent photographs form a principal feature of the bulletin and should serve their intended purpose very well ; it is, however, unfortunate that a wrong indication is sometimes given of the stages of development in which the eggs or larvae may be found in fresh faeces ; thus it is wrongly implied that the eggs of lungworms of pigs and sheep are usually found in the faeces, and that the eggs of hookworms of the dog and the caecum worms of fowls are embryonated when passed in the faeces. A mistake appears also to have crept in on page 63 where a psoropt figures in association with sarcoptic mange in the dog].—E. L. Taylor.

Seifried, O. (1933). Ein einfacher Glasmörser für weiches Gewebe. [**A Simple**

Glass Mortar for Soft Tissue].—*Zlb. Bakt. I.* (*Orig.*). **127**. 383-384. 1 fig. [1 ref.]

A description of a simple glass mortar for grinding up soft tissues, designed by the author, particularly for use when working with highly infected material and so made that to a large extent the danger of contamination from the air or the hands and of leakage is eliminated.—J. R. M. INNES.

SCHARR, E. (1933). Eine Kanüle mit Universalstilett zur Entnahme von Probematerial für die Diagnose der offenen Lungentuberkulose des Rindes. [**A Canula with Universal Stilette for taking Material for the Diagnosis of Open Pulmonary Tuberculosis of Cattle**].—*Berl. tierärztl. Wschr.* **49.** 391-393. 4 figs.

In the diagnosis of bovine tuberculosis in Germany the lung mucus test is of great importance and, at the last meeting of the directors of the bacteriological institutes of the chambers of agriculture of Prussia, it was agreed that a canula not requiring preliminary incision in the skin of the neck was needed. The author has produced such an instrument with the end of the canula bevelled and spear-shaped for making a puncture longitudinally. The stilette, which fits any of numerous canulae, is adjustable for length by a screw collar.—J. E.

MISCELLANEOUS.

MANSON-BAHR, P. (1933). **A Paper on British Discoveries in Tropical Medicine During the Last Hundred Years.**—*Brit. Med. J.* Feb. 25th. 301-305. [1 ref.] [Paper read in opening a discussion in the History of Medicine Section at the Centenary Meeting of the British Medical Association, London, 1932].

This paper sketches the history of British tropical medicine from the days of the early clinicians of the Honourable East India Company to the present day discoveries of modern research workers. The history of discoveries in such diseases as malaria, trypanosomiasis, leishmaniasis, yellow fever, beri-beri, amoebiasis, cholera, plague and filariasis are dealt with. [The work of EVANS in connection with early discoveries in trypanosomiasis is not mentioned].

—U. F. RICHARDSON.

SERGENT, E. (1933). L'institut Pasteur du Maroc à Casablanca. [**The Pasteur Institute of Morocco at Casablanca**].—*Ann. Inst. Pasteur.* **51.** 5-13. 9 figs.

A description of the latest addition to the biological institutes of French North Africa. This new Pasteur Institute, sanctioned in 1928, was completed by the beginning of 1932. Dr. G. BLANC, formerly of the Institute Pasteur hellénique was appointed director. Casablanca, the economic capital town of Morocco, was chosen as the site. The lay-out of the estate and buildings is described and illustrated by ground plans and photographs. In addition the institute has been presented with an annexe in the country some 9 miles from Casablanca.

The work performed includes research into :—(1) infectious and parasitic diseases of local importance in human beings, animals and plants ; (2) advanced instruction in laboratory methods appertaining to human and veterinary medicine and to agriculture and (3) routine services necessary to human, animal and agricultural well-being of Morocco.—J. E.

TAAGEPERA, K. (1933). Estlands Pferdezucht und das ostfriesische Pferd. [**Horse Breeding in Estonia and the East Friesian Horse**].—*Eesti Loomaarst. Ring.*

9. 112-122. 4 figs., 2 tables. [Abst. from abst. in German by H. RICHTER (TARTU)].

An account of the official policy in connection with horse breeding in Estonia. A policy for improvement was inaugurated in 1922 and the results up to the present time are said to be satisfactory. Three breeds are mainly fostered, the Estonian farm breed, the pedigree Tori breed and the Ardenne type. The importation of the latter has led to an improvement in stamina.—J. E.

VAN DER PLANK, G. M. (1933). Biometrisch onderzoek in de veeteelt. [**Biometric Research in Cattle Breeding**].—*Tijdschr. Diergeneesk.* **60.** 512-520. 1 table.

The author states that the results of experiments that can be carried out in large numbers should be controlled by mathematical methods, based on the theory of probabilities, otherwise they might be incorrect. As examples, van der Plank indicates the use of biometrics in the breeding of cattle, as he saw it applied by Prof. KRONACHER in Germany.—A. KLARENBEEK (UTRECHT).

OFFICIAL AND OTHER REPORTS.

NIGERIA. (1933). **Annual Report of the Veterinary Department for the Year 1932.** [HENDERSON, W. W.] pp. 21. 2 tables, 2 appendices. Lagos: Government Printer. [fcp] [2s.]

The staff of the Department consisted of 2 administrative officers, 3 research officers, 3 laboratory assistants, 12 veterinary officers, 10 stockmen, one mechanic, 129 African departmental staff and 138 native administrations' veterinary staff. One research officer is seconded to the Medical Department's Tsetse Investigation Division and one stockman is seconded to the Kano native administration for special duty in improving methods for the production of hides and skins.

The number of cattle immunized to date against rinderpest since the inception of the scheme in 1925, is 1,173,599; the great majority have been immunized since 1928. Mortality, although variable, as it includes infected herds brought for inoculation, is on the whole not much more than 2 per cent., including losses from all causes in herds treated during one month's period of quarantine at the various immunization centres.

In some areas difficulties were experienced through losses from redwater, especially in the rainy season; this was combated by the use of goat virus or passage of virus through goats, routine treatment of susceptible animals at the 7th day after inoculation with trypan blue solution, or by the addition of a 2 per cent. solution of trypan blue to the virulent blood used.

To combat possible transmission of trypanosomiasis from an infected virus producer, it has been the routine for some years to add a solution of tartar emetic to make a dilution of 1 : 20,000 in the virulent blood used.

The campaign against blackquarter infection in the past 4 years has reduced the losses to sporadic cases among infected young stock; there has been no serious epizootic outbreak since 1930.

Although in comparison, contagious pleuro-pneumonia of bovines has been dealt with by immunization to a lesser extent than rinderpest, the realization by native authorities of the necessity for segregating infected herds, together with what the Department is doing at the large trading centres, is having its effect on the number of outbreaks. The great difficulty with the use of an attenuated live culture vaccine is the varying susceptibility of cattle in different parts of Nigeria. While in Zaria large numbers of cattle (over 5,000) were inoculated in the dewlap

without any adverse results, in other parts of Nigeria there have been most alarming results from inoculations at the normal seat of inoculation, the tip of the tail. This is a great contrast to the apparent simplicity of this method of immunization in the Sudan, as the early generations used there as vaccine are definitely fatal to the majority of Nigerian cattle. In the Sudan the 7th generation of a culture can be used, whereas in Nigeria even about the 84th and later generations have on occasions caused considerable alarm to field officers.

Haemorrhagic Septicaemia.—Vaccine has been used in the control of outbreaks, but it has been decided that, commensurate with the cost of production, it has not any great value in suppressing outbreaks. Cattle owners in affected areas, however, have great faith in its virtues.

Anthrax.—During 1932, for the first time, anthrax caused some anxiety in Nigeria. Confirmed outbreaks occurred at such widely separated places as Karim in Adamawa Province, Geidam in Bornu Province and Ambursa in Sokoto Province. A vaccine was prepared by the pathologist and 2,175 cattle were immunized before the end of the year. It is recorded that in Sokoto 4 horses and 7 of 11 men died, who ate meat from a beast infected at the time of slaughter.

Foot and Mouth Disease.—This has not been serious even though outbreaks have been reported from most of the provinces. Under natural conditions the nomadic Fulani herdsmen do not fear the disease or give much attention to infected beasts.

Trypanosomiasis.—Treatment, as it becomes better known by cattle owners, is more frequently sought. There appears to be a good deal of resistance to trypanosome infection, either with *T. vivax* or *T. congolense* in Fulani-owned cattle, but under adverse conditions there is no question of the virulence of the parasites. All veterinary officers now treat numbers of horses and donkeys for trypanosomiasis at the various clinics. The most successful drug is tartar emetic and it is also the cheapest.

Helminth Infestation.—This is particularly common. *Haemonchus contortus* adults, oesophagostome nodules caused by the irritation of larvae of *O. columbianum* and *Ascaris vitulorum* are the most common causes of poverty or actual loss among calves. Oesophagostomes together with *H. contortus* are the deciding factor in keeping sheep or goats in any area. In Zaria, while local goats survive these parasites, they seem to be the main cause of losses among goats exported from the dryer parts of Niger, viz. from Sokoto. *Fasciola hepatica* has also caused losses, to some extent, among goats and sheep and among adult cattle in marshy areas in Sokoto, Hadejia (Kano Province) and probably in parts of the valley of the Niger and Benue rivers *Stilesia hepatica*, although present, is remarkably rare in goats and sheep in Nigeria as compared with any part of South or East Africa.

Other Diseases.—Contagious pleuro-pneumonia of goats during the rains is a most serious cause of losses. Other conditions which are serious from their effect on the value of goat skins are demodectic mange and streptothricosis. Among horses and donkeys, trypanosomiasis and epizootic lymphangitis are the most serious cause of disability and loss. With native owned equines, lacerated mouths and tongues from cruel bits, saddle, girth and crupper galls and their sequelae are more frequently a cause of disability than epizootic disease.

The actual cautery is used by the indigenous people for the majority of ills in equines and ruminants. The cure is quite often worse than the disease.

The Veterinary Research Officer has continued his research into the skin

diseases of sheep and goats. Epizootic lymphangitis in horses and donkeys has been found to respond well to a weak solution of biniodide of mercury with potassium iodide, given intravenously.

There is a fairly common, apparently non-specific, but pernicious anaemia of the dog in Nigeria ; a similar condition has been observed in South-East Africa. In treatment, organic arsenicals and tartar emetic appear to have no effect. Trypan blue solution has been known to reduce the enlarged spleen without affecting the course of the disease, but quinine is thought to produce beneficial results. Actually, imported dogs, which are the main victims, more often die in spite of any drug administered and however attentive the nursing. The cross country-bred animal is rarely affected. The persistence of a high temperature over long periods is a feature of the disease.

The Stock Farm has been maintained and a number of feeding experiments have been carried out with locally obtained products. No further reactors to the tuberculin test were found on a retest of the farm cattle. The manufacture of clarified butter fat has been continued, some 10,000 lb. being produced.

Approximately 10,000,000 lb. of cattle hides and sheep and goat skins were exported from Nigeria, their value being £582,478 ; this is a decrease in the quantity and also on the value assessed in 1931. The Department's scheme for improving the methods of production has been extended considerably with excellent results.

SLAUGHTER CATTLE.—It is estimated that 218,000 cattle are slaughtered in the Northern Provinces, and 130,000 went by rail or crossed on hoof by the Jebba Railway Bridge and went on to the Southern Provinces ; this does not include the very large numbers that cross the Niger and Benue rivers in the dry season or by canoe, and those from Adamawa which pass to the South—at least another 100,000. Market prices for cattle during the year have been very low on account of the lack of money and the necessity for cattle owners to raise money at a sacrifice for tax payments.

A number of new animal clinics have been opened and are proving very successful.

The health of the staff during the year has been satisfactory.

—JEFFREY A. GRIFFITHS.

NIGERIA. (1933). **Annual Report of the Pathologist.** [HALL, G. N. A.]—*Ann. Rep. Vet. Dept.*, 1932. pp. 12-17. Lagos : Government Printer. [fcp].

The amount of research work has been restricted owing to reductions of staff in 1931 and an increased demand for the biological products of the laboratory. The length of the report was drastically cut down for publication on the grounds of economy.

RINDERPEST.—Further experiments were carried out at the laboratory to find a practical means of preventing the known mortality among young cattle susceptible to redwater after undergoing serum-virus inoculation for rinderpest immunization.

Virulent blood smeared on the septum nasi produces an infection, but when an animal is injected with serum also the method frequently fails and therefore cannot be relied upon. Virulent nasal secretion, given subcutaneously, frequently causes abscesses and may also transmit redwater from infected red [blood cells contained in the secretion. Virulent peritoneal fluid proved as useful with Nigerian cattle as virulent rinderpest blood, as piroplasms in the contained red cells appear to be resisted by Nigerian cattle. [It appears possible that at some

centres in Nigeria, infected ticks may be an important source of redwater infection in the case of susceptible cattle brought in from a distance to rinderpest immunization camps].

The minimum infective dose of virulent blood proved to be from 0·2 to 0·02 c.c. at the top of the thermal reaction, but frequently failed in doses of 0·002 c.c. Peritoneal fluid gave positive results in doses of 2 to 0·2 c.c., but was negative in doses of 0·002 c.c. In other experiments there was no difference in virulence.

The injection of sodium citrate or sodium chloride solutions into the peritoneal cavity causes an increase in the quantity of recoverable peritoneal fluid, but the numbers of red cells in the fluid increases if the saline solution remains in the body for some time, so that when used as a source of virus, there is still a possibility that it will transmit piroplasms.

Natural peritoneal fluid from animals reacting to rinderpest infection was diluted with normal saline and citrate to make up the quantity to 1 l. or more, depending on the amount of fluid collected. This contained very few red cells and proved quite satisfactory for use as virus for the immunization of animals by subcutaneous injection of virus and serum. It is no more reliable than virulent blood when rubbed on the septum nasi. It is said that the use of goat virus does not always prevent the transmission of piroplasms [no experimental evidence is given].

Anthrax.—A description is given of the preparation of anthrax vaccine. Anti-anthrax serum is also being produced.

Contagious Pleuro-Pneumonia of Cattle.—The only change in the method of production of the vaccine is the use of ox serum in place of horse serum in the culture medium. The 126th subculture is now being used as a vaccine, but this is still too virulent to inoculate anywhere except in the tip of the tail ; an animal inoculated with the 105th subculture died.

Haemorrhagic Septicaemia.—Animals vaccinated resisted 10 M.L.D. of a virulent culture, but not a larger dose. The reactions, however, were very severe.

Fowl Diseases.—Vaccines were prepared for dealing with epizootics of fowl pox and fowl typhoid.

Pustular Dermatitis of Sheep and Goats.—A vaccine was prepared from an ovine strain and good results were obtained by its use in protecting sheep.

Experiments were carried out which proved that the simultaneous use of a rinderpest serum-virus along with blackquarter vaccine produces a solid immunity to both diseases. In 2 single cases anthrax vaccine was also given as well and immunity to all 3 diseases was established. During the year reports were made upon 1,173 *post-mortem* examinations and 373 specimens.

—Jeffrey A. Griffiths.

Nigeria. (1933). **Appendix B [Skin Diseases of Goats]. Annual Report of the Veterinary Department for the Year 1932.** [Beaton, W. G.] pp. 17-21. Lagos : Government Printer. [fcp] [2s.]

This report on investigations of skin diseases of goats at Kano Veterinary Laboratory was condensed for publication.

In an examination of approximately 15,000 freshly flayed goat skins, demodectic mange and streptothricosis were found to be the only diseases of importance.

Demodectic Mange.—The lesion in demodectic mange and its economic effect on the value of the skin are described. It is estimated that, on account of this disease, 15 per cent. of the raw material is reduced from classification as a first class product to a lower grade. The lesions are most frequent in the region

of the perineum and the tail; single or massed nodules may however occur in any part of the skin, but more frequently over the shoulders or outside of thigh. It is not considered that there is any seasonal incidence. The skins of animals under one year of age are rarely visibly infected. There is no variation in the incidence of infection in the two sexes.

The parasite could not be demonstrated in healthy skins and, in various experiments to ascertain the way in which the disease is transmitted, no evidence could be found that ectoparasites, particularly lice and fleas, play a part. In an experiment on the effects of using an arsenical dip the treated flock showed some apparent cures, in some cases the number of lesions increased, but no fresh cases occurred. There were several fresh cases in the undipped flock. [The beneficial effect of dipping in the prevention of demodectic mange of cattle in Nyasaland in 1913 to 1915, was recorded by GRIFFITHS in (1915). *J. Comp. Path. & Therap.* **28.** 61].

STREPTOTHRICOSIS.—Lesions, incidence and course are described. The disease was transmitted with a suspension of the scab from an infected goat which was rubbed into a shaved and scarified area of skin. The disease was transmitted to a young goat by application to scarified skin of a suspension of crushed ticks (*Ambylomma variegatum*) taken from an infected bovine. No immunity occurs in an animal which recovers and there is no resistance to artificial transmission of the disease in the area of skin previously infected. The spores of the streptothrix remain in healthy skin until conditions are favourable, i.e., until there is heat and excessive moisture, such as occur in the rainy season.—JEFFREY A. GRIFFITHS.

KENYA COLONY AND PROTECTORATE. (1932). **Annual Report of the Deputy Director (Animal Industry) and Chief Veterinary Officer for 1931.** [BRASSEY-EDWARDS, H. H.]—*Ann. Rep. Dept. Agric. Kenya.* 1931. pp. 213-287. 23 tables. Nairobi: Government Printer. [8vo] [5s.]

No retrenchments on grounds of economy were made in this colony during the year. The veterinary staff consisted of the C.V.O., the Deputy C.V.O. (Mr. DAUBNEY, who has since been appointed to the post, officiated in the appointment), 3 senior veterinary officers and 13 veterinary officers.

The veterinary policy is being changed "in the direction of refraining from the use of virulent material." For instance, rinderpest immunization by non-virulent vaccine is replacing the previous virus-antiserum method.

RINDERPEST.—29 fresh outbreaks occurred, chiefly amongst squatter stock. The disease had the lowest incidence on record among the cattle of farmers in the settled areas. The disease control situation showed a marked improvement and an important meeting between veterinary representatives from Kenya, Tanganyika and Uganda was held to decide on a common policy with regard to rinderpest. It was agreed that:—(1) the eradication of rinderpest must receive the active support of the Provincial Administration concerned; (2) the resources of the territories concerned must be pooled and (3) any therapeutic measures must not involve the use of virulent material in rinderpest-free areas.

The issue of rinderpest vaccine [see research report] for the year was more than double that of the previous year and totalled 28,000 doses.

EAST COAST FEVER.—The incidence has remained very steady over the last 5 years. Progress in research is dealt with in the research report.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.—There was a decrease in incidence in the settled areas and in these parts of the colony control measures should soon eradicate it. The problem is more complex in the native reserves. Improved diagnosis by a serological test is being developed.

PIROPLASMOSIS AND ANAPLASMOSIS.—These diseases are guarded against in imported cattle by vaccination and, in the affected areas, cattle are protected by dipping.

TICKS AND TICK-BORNE DISEASES.—Much valuable information on the distribution of ticks and the diseases that they convey in the colony was obtained by the veterinary entomologist, Dr. E. A. LEWIS [see *Dept. Agric. Kenya Bull.* No. 17 of 1931 and No. 6 of 1932].

FOOT AND MOUTH DISEASE was prevalent and many mild outbreaks were reported. One severe outbreak caused an 18 per cent. mortality in 514 head of cattle and was followed by great loss in milk yield and reduced fertility. The types of virus are being studied.

MISCELLANEOUS.—Other diseases continuing to give some trouble are :—anthrax and blackleg, bovine contagious abortion, horse sickness, trypanosomiasis, sheep scab, bovine cysticercosis and bovine sterility.—J. E.

KENYA COLONY AND PROTECTORATE. (1932). **Annual Report of the Chief Veterinary Research Officer for the year 1931.** [WALKER, J.]—*Ann. Rep. Dept. Agric. Kenya.* 1931. pp. 288-314. 3 tables. Nairobi : Government Printer. [8vo] [5s.]

The routine work is first described and the number of doses is given of the various biological products that were prepared. The main part of the report deals with research work as follows :—

DISEASES OF CATTLE.

EAST COAST FEVER.—(1) An attempt was made to immunize cattle by simultaneous multiple subcutaneous and intradermal inoculation of spleen pulp and blood from a fatal case of the disease, followed by repeated subcutaneous inoculations of serum from immune cattle, but 7 of the 9 beasts employed succumbed to natural infection ; (2) similarly, 7 beasts given an intravenous inoculation of spleen pulp and blood from a fatal case and given serum like the first lot, also succumbed to natural infection ; (3) 80 c.c. of 2·5 per cent. iodine solution given intravenously was found to be valueless in cases of fresh infection.

The transmission of East Coast fever was studied, with the following results :—(1) the passage of virus by intravenous inoculation of spleen pulp only procured a small percentage of transmissions, the proportion falling to zero at the 4th passage ; (2) Infestation of the ears of susceptible calves with tick nymphs (*Rhip. appendiculatus*), varying in number from 45 to 150, which engorged as larvae on cattle reacting to East Coast fever, does not invariably transmit East Coast fever ; (3) there was failure in attempts to infect a young wild buffalo with East Coast fever and with piroplasmosis and anaplasmosis by infestation with ticks, subcutaneous inoculation and by contact in an enclosure ; *Th. mutans* infection was apparently transmitted, but caused no obvious illness.

An experiment to test the solidity of immunity in cattle to East Coast fever was begun.

RINDERPEST.—The efficacy of vaccination with 3 doses of formalinized spleen vaccine was tested with favourable results, protection against inoculation with virulent blood being secured in some 60 per cent. of cases. 1 per cent. formalin in spleen vaccine was found to sterilize it effectively.

It was found that rinderpest virus on the feet of dressed poultry dies within 72 hours in cold storage, though ox blood retains its virulence up to one month or more in cold storage.

SWEATING SICKNESS OF CALVES was observed in the Colony.

Diseases of Horses.

Horse Sickness. [Title omitted in orig.—p. 304.]—Inoculation with 3 doses of spleen vaccine, followed by virus inoculation, was applied to 71 horses of which 6 died. Spleen vaccination alone was applied to 640 horses, of which 29 died. The vaccine contained in 1 to 300 formalin by volume. Blood virus containing 1 per cent. potassium citrate and 0·2 per cent. formalin was found to be still virulent after 16 days cold storage. Toluol was found to be useless as an attenuating agent for vaccine preparation. Experiments were also performed on foals ; some immunity appears to be transmitted *in utero* when the dams are vaccinated (vaccine plus virus) during pregnancy.

Diseases of Swine.

East African Swine Fever.—One herd of 10 pigs was successfully hyper-immunized by the serum-virus method, whilst a second lot of 9 pigs reacted and died. Six further pigs which had previously reacted to and recovered from the simultaneous inoculation all died when infected by blood between 9 and 24 months later.

Diseases of Sheep and Goats.

Nairobi Sheep Disease.—Severe outbreaks occurred during the year and research work on transmission by ticks was carried out. Species other than *Rhipicephalus appendiculatus* appear to be involved. Research is proceeding. Attempts to produce a formalinized vaccine have failed.

Rift Valley Fever.—The results of investigation have been published in the scientific press.

Contagious Pleuro-Pneumonia of Goats.—Research showed that infection is produced by the injection of filtered pleural exudate into the chest or trachea.

Miscellaneous.

Research was carried out on helminthiasis and poisonous plants and the tick survey and study of entomological problems was continued.

A librarian was appointed for the first time to take charge of the considerable quantity of literature now available at Kabete.—J. E.

BOOK REVIEW.

Wall, R. E. [Major, M.R.C.V.S.] (1933). **Keeping a Dog. Its Training and Care in Health and Sickness.** pp. x + 135. 6 text figs., 2 plates. London : A. & C. Black. [8vo] [3s. 6d.]

As the author explains in his introduction, the object of this book is to meet the urgent demand for a reliable work for all who keep dogs. The ground has been covered comprehensively and in a very practical manner, so that the reader should be able to keep his dog in the best condition and know what first aid measures to adopt in the course of breeding and in case of illness. Only " fool-proof " methods of treatment are given. Altogether a very useful book that fulfils its purpose admirably.—J. E.